CHEMICAL INDUSTRIES

VOLUME XXXIV NUMBER 5

Consequences

AS OPPOSITION to NRA becomes more vigorous and vocal it naturally becomes more specific and personal. Not the principles involved, but some dramatic bit of individual injustice; some trivial, but arresting price fixing; some tragic climax in a labor dispute, will crystallize this opposition into political action. The danger is great that such emotional mainsprings will result in an ill-considered or partial revision of a program embracing mixed objectives which has accomplished debatable results. If we are to do any clear, independent, conclusive thinking we must strive valiantly to see ahead to the ultimate conclusions of this frankly experimental law.

NRA deliberately traded capital expenditures for consumers' purchasing. As a relief measure this spreading of purchasing power at the expense of business profits was successful till late this winter. Payrolls increased almost as much as did the cost of living so that the net gain in purchasing power was practically the full gain in numbers of re-employed. More recently prices have risen higher than wages plus employment. The effectiveness of the relief is thus defeated, and as a recovery measure, a dollar on the payroll can buy only a dollar's worth of goods while a dollar in black on the balance sheet multiplies itself through regular credit resources and would have been available for the sorely needed expenditures for repairs and replacements.

This drag on recovery is offset, so it is claimed, by the NRA codes which provide a means of guaranteeing profits. But the ultimate consequences of the codes will be either to limit output or to protect the inefficient producer. Production quotas will stabilize profits, but only at the expense of the proper balance with normal demand. No-sales-below-costs, established on present inflated investments and present reduced operations, is a big blanket to cover waste and incompetency.

Such consequences do not make for permanent, widespread national prosperity. This is our real, our only objective. This law and its administration should be judged by these standards.

Without Due Process of the Law One might search our industries from abattoirs to zinc mining, from Tacoma to Brownsville, and not find so clean-cut a case against the unfortunate results of the assumption that collective bargaining means union recognition as is provided by the strike at the National Aniline plant in Buffalo. This pioneer dye factory has been in operation forty-seven years with no union and no strike. Wages have always been well above the local average. No general cut was made during the depression and work was staggered with careful concern of the workmen's needs. For years safety and welfare work have been carried on regularly and efficiently. Men and management were on notably good terms.

Then came the famous Section 7A. In every item the Company meets the wages and hours provisions of the Chemical Code, and it has never refused to meet and discuss with its employees or their appointed representatives. Wages, hours, and conditions of work are not in dispute. But, because the Company refuses to sign a contract with the Aniline Workers Union, confirming present hours and rates for a year, a strike is called, violence results, the Company is haled before the Labor Boards at Buffalo and at Washington.

Against such unwarranted, outside coercion there is no redress under the law, and so long as there is even a semblance of official sentiment that collective bargaining can only mean contracts with A. F. L. subsidiaries there is apparently little relief from such costly and unjust proceedings.

Codes for Chemists Those chemists who led the fight against the proposed NRA code for consultants deserve well of their profession, for the proposed regulations would have been a very long step in exactly the wrong direction. There are serious evils arising out of the present practices of technical consulting work; but they are not to be cured by regimenting the chemists under trade union rules. What is sorely needed is a code of professional ethics and such a *esprit des corps* as the physicians and the attorneys display.

Standardization of hours and wages under a NRA code would strongly favor the larger, organized laboratories, which too often tend to become over-commercialized testing mills, at the expense of the individual consultant who is of necessity rendering a personal service. To attempt to cure the unfair competition of the university staff member, with his endowed laboratory and student assistants, and yet to exempt all state and municipal institutions would not only fail to remedy one great evil, but would perpetuate and subsidize that evil in its most vicious form. Possibly the most dangerous part of this whole preposterous proposal was the threat it made against the confidential relations that ought to exist between the consultant and his clients. This is indeed the very cornerstone upon which any profession is reared, and to destroy it would be professional murder.

We have more than once pointed out the malpractices of some consulting chemists and criticized the unfair competition of most universities with their own chemical alumni; but we have a very wholesome respect for the honest, competent, independent technical consultants and a keen appreciation of the valuable services they render our industry. Their outside point-of-view, their neutral opinion, their independent candor which no employee can have, their wide and various experience, their disinterested confidence are often needed. To check results and to arbitrate points at issue no one can take their place.

All this work is highly trained, experienced, confidential, personal service. Its characteristics and the qualifications it demands are all notably professional. The future of the consulting chemists and engineers lies in developing their professional relationships with industry and in fostering among themselves the professional spirit. It has taken several centuries for medicine and the law to win and hold the professional status. The technical consultant is a newcomer in the professional field, but given time he is destined to occupy in industrial fields the same important place. To twist or thwart this natural development would be a very serious mistake.

Quotation Marks

"The federal debt now amounts to over 24 billions of dollars, and on the basis of all present indications will reach somewhere around 32 billions. This means a mortgage of approximately $1,200 on every family in the United States. Government funds and government credit mean taxes—taxes to be paid now or some time. What we are really doing is buying recovery with taxes. All the costs and liabilities that are now being transferred from various private groups to the government will ultimately fall on the shoulders of the tax payers. The costs of the Reconstruction Finance Corporation and the losses that it eventually suffers from worthless debts or impaired collateral must be made up from government revenue, which means taxes."—*Prof. Herbert D. Simpson, Northwestern University Alumni News.*

A Chemical Tourist Through the South

By Williams Haynes

March 20 to April 22, just five weeks; from the new bromine-from-the-sea plant at Wilmington, N. C. to the phosphate fields of southern Florida; around the Gulf coast to the new alkali plant at Corpus Christi; northwest to the new potash mines in New Mexico; across the plains, through the petroleum and gas fields, to the new salt products plant at Tulsa; 7131 miles by the speedometer; 21 chemical operations visited; three addresses delivered; five tires changed; and the schedule broken only for an extra dinner at Antoine's in New Orleans and a sandstorm in West Texas—these are the vital statistics of the chemical tour which Mr. Haynes, accompanied by George F. Hasslacher, has just made. He brought back a fat notebook, a thin pocketbook, and about 150 photographs, the raw materials of this and two succeeding articles recording the southern chemical-economic developments.

I

Down the Atlantic Seaboard

THREE-QUARTERS of the several million dollars which chemical industry spent for new plants last year was invested in the South. Half of these capital expenditures this year will be made in the South. By next year there will be a notable tilt southward in the balance of our chemical production, and more than this, the South will be the home not only of new centers of production of standard heavy chemicals, but also of new products and of new processes.

It would be gross exaggeration to call this development a southern migration of chemical operations, although an enthusiastic transplanted Yankee prophesied we should be moving CHEMICAL INDUSTRIES bodily to New Orleans which he quite firmly believes "will become American chemical headquarters." Warmed doubtless by the unusually severe weather reports from the North this past winter, this optimism may be discounted as heavily as you wish, nevertheless this southern trend is significant.

What has prompted it?

What does it mean?

Where will it end?

No simple answer can be found to these leading questions. The more one knows of these southern chemical developments, the more important they appear and the more complicated their industrial implications.

Below the Frost Belt

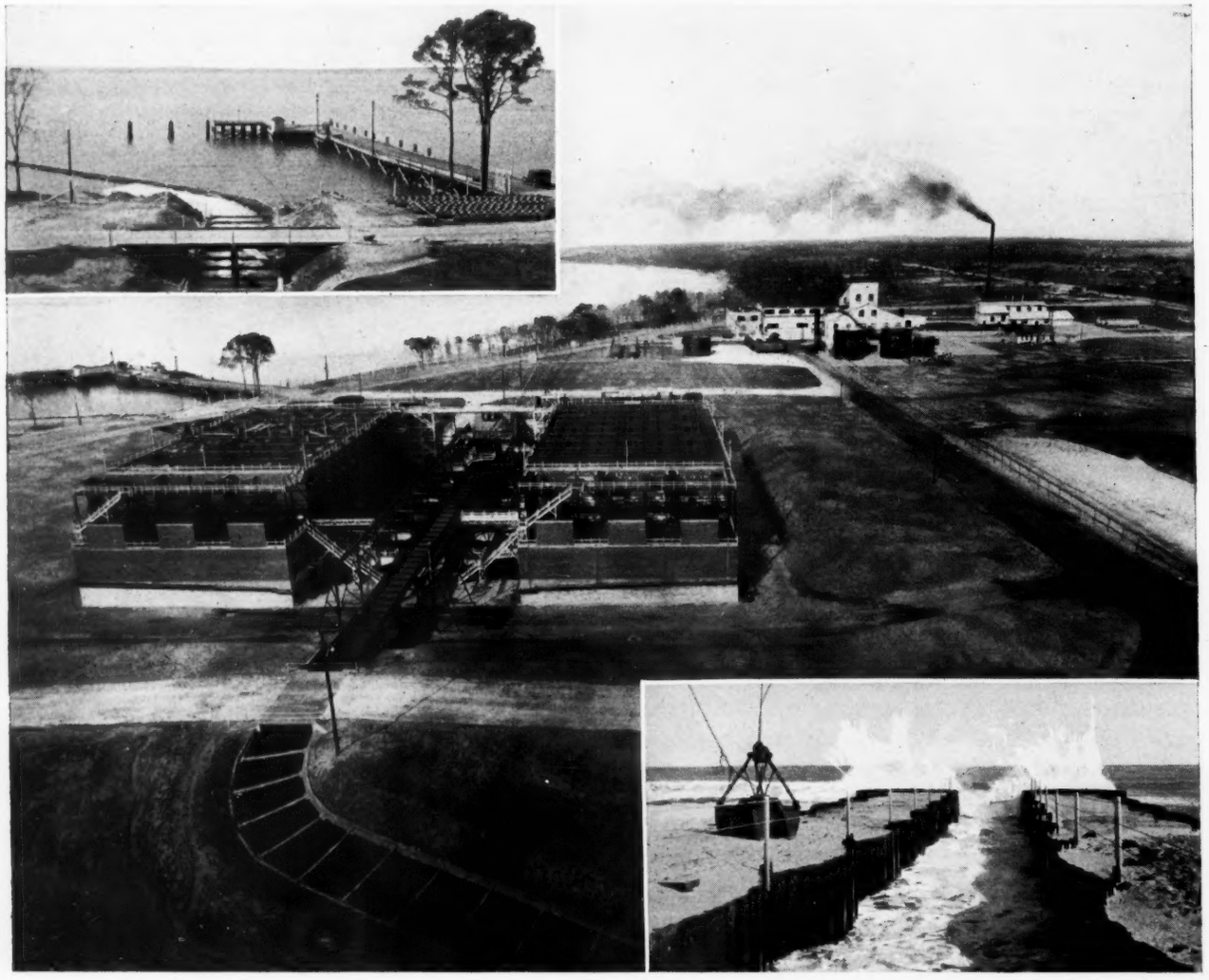
Cheap, available, abundant raw materials are often an obvious motive for southern location. The Gulf Coast combination of sulfur, salt, petroleum, and natural gas, with coke, limestone, and phosphate rock available by water transport is unique and intriguing. The South is obviously the natural habitat for cellulose and hydrocarbon developments, both of which promise exceptionally great expansion in the chemical future.

Chemical production below danger of freezing temperature means cheaper installations and more convenient operation. The climate is not only kind to pipe lines and pumps, it is equitable in many sections as shown by the fact that only two days were lost during the 150 days the Dow bromine plant was building. But you cannot generalize on southern climate. One night on the Gulf Coast of Texas we slept soundly through a downpour of 4.1 inches: three days later, a thousand miles away we were still in Texas where they had seen no drop of rain since September 1933 and where the full year's fall is usually only 0.9 inches more than the single night's rain of the coast region.

The Cart Before the Horse

The meaning of this southward movement is even harder to appraise. Chemical industry is proverbially dependent upon its consuming industries and historically follows them into new territories. The new southern plants on the coast are not shut out by freight costs (thanks to the big water-rail differential) from eastern or northern markets and are at a positive advantage in the Mississippi, Missouri, and Ohio Rivers territory as against competitors on the Atlantic side of the Allegheny Mountains. Reversing the usual order, available chemical supplies may be a helpful incentive to the establishment of chemical process industries in the South. Certainly a number of wide-awake Chambers of Commerce are doing plenty of wishful thinking along these lines. Even today the effects upon the local communities of these chemical plants are considerable. At Brunswick, Georgia, the Hercules wood turpentine plant has done what the T. V. A. is planning at Muscle Shoals. They are lighting two cities and selling surplus electrical power to the neighboring countryside. At Grande Ecaille, La., a new town is being built where a swamp was a year ago, and for ten miles up and down the Delta of the Mississippi, new houses are building, old houses are being renovated, new crops of vegetables, and

eggs, and milk are finding a profitable market. Carlsbad, New Mexico, hardly appreciates it yet, but it is in a fair way of being transformed from a cattle town and tourists' rendezvous into a mining center. Corpus Christi, with its new deepwater harbor, welcomes the Southern Alkali's new plant as harbinger of an industrial springtime that will sow a rich crop of local prosperity. The Ethyl-Dow plant has a weekly payroll of something over $3000—good "new money" for the landlords, the merchants, and the movies of Wilmington; and the businessmen of this old North Carolina port hark back to the wartime days of its shipbuilding activity for an adequate comparison.



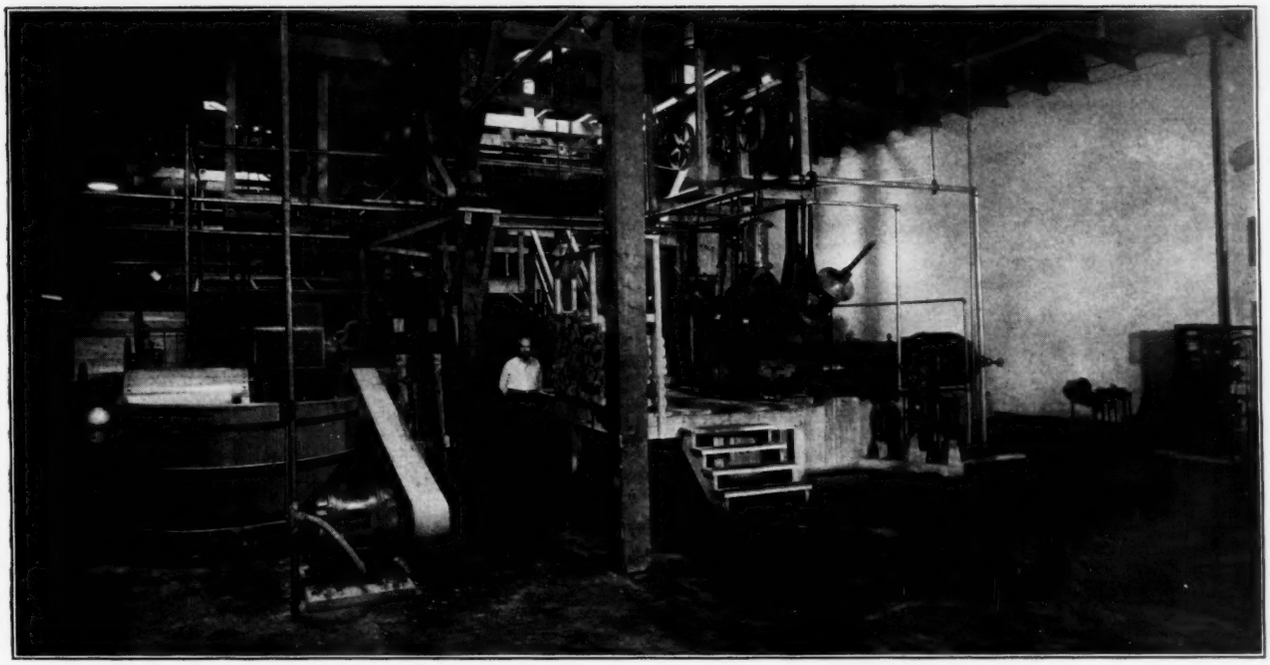
The Ethyl-Dow bromine plant on a neck of land between the ocean (see the intake for sea water in the lower right hand corner) and the Cape Fear River (see the outlet of the water and the company dock, upper left hand corner), producing 15,000 lbs. of bromine daily from 37,000,000 gallons of ocean.

Of all recent southern chemical developments this bromine-from-the-sea operation has most firmly caught the public fancy. The publicity hounds at the A. C. S. St. Petersburg meeting smelled a good story in Dr. Stewart's casual reference to gold from seawater in his paper* on the Dow process of extracting bromine and the daily papers all over the country wrote glittering headlines. Everywhere throughout the South the first question asked anyone who has actually visited the new Dow plant is about this fabled gold extraction. The facts are plain. In a million parts of seawater are 67 parts of bromine: in a billion parts, 2⅓ parts of gold. A cubic mile of ocean contains $126,000,000 worth of bromine and at New Deal values, $6,125,000 of gold. Handling 37,000,000 gallons a day Dow is extracting 15,000 pounds of bromine. In the same goodly quantity of water there is about $40 worth of gold. I suspect that, as they are handling the water anyway and since Haber has thoroughly researched the gold extraction processes, it is not unlikely they will at least make some experimental gold recovery—enough, as one of the officers jokingly said, to make rings for the directors. It would be a clever publicity stunt.

The manager of this new Dow plant is an embarrassingly young engineer transferred from Midland, G. F. Dressel. He has an engaging smile, a real sense of humor, and a very great modesty of his own accomplishments with a very great pride in his plant's performance of 101 per cent. of projected capacity the second month of operation.

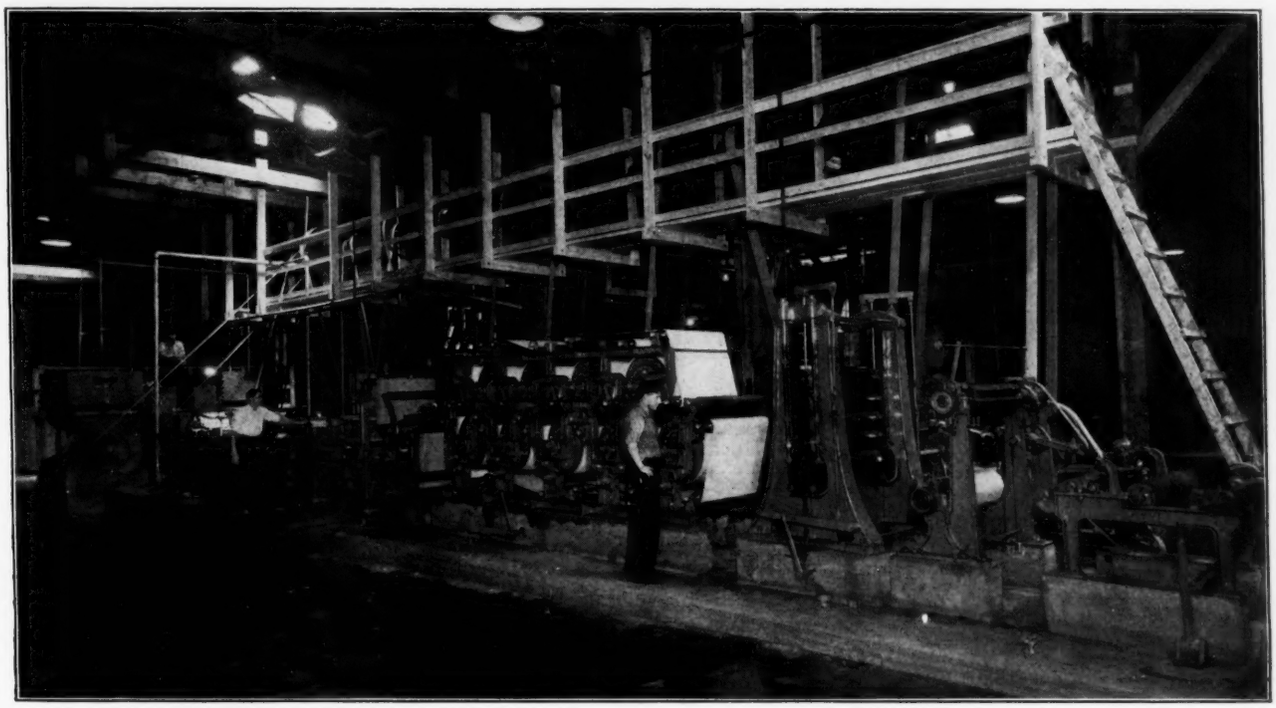
"The plant was really built under the direction of

*See Ind. & Eng. Chem., Vol. 26, No. 4, (April '34) p. 361.



A. P. Beutel, our chief of construction, and the process worked out by our chemists under the direction of Leroy C. Stewart, our research director. Of course, we had a big initial advantage in using what is essentially the same process we use in extracting bromine from our Midland brines; but our mother liquor here, the ocean, actually contains less bromine than our effluent after the extraction at our home plant.

"Briefly we replace the bromine in the sea water with chlorine, blow it out with air, remove it in absorption towers by a soda ash solution forming sodium bromide and bromate. This bromide-bromate liquor is treated with sulfuric acid to liberate bromine, which is condensed to pure liquid bromine and which in turn is mixed with ethylene gas to form ethylene dibromide, our finished product. We make our ethylene from ethyl alcohol shipped down through the Inland Water Way from Deepwater, Del. and our ethylene dibromide goes back the same route to Carney's Point, Del. where it is blended with tetra-ethyl-lead for motor fuel by our ally in this enterprise, the Ethyl Gas Corporation. Both our bromine extraction and our bromine-ethylene reaction operate at above 90 per cent. efficiency."



The Herty experimental wood pulp plant at Savannah, Ga. Above, left to right, beater, grinder equipment. Below, complete paper machine. Left to right, screens, Fourdrinier, drying roller, etc.; overhead, shafting and pulleys for paper machine.

The typical small unit still producing rosin and turpentine from gum collected from the pine trees of a comparatively restricted neighborhood and shipping the output to be graded and marketed later.

The alliance Mr. Dressel mentioned is mutually advantageous in the extreme. The motor blend use having roughly quadrupled the market for bromine, and still growing, Dow, the largest producer, faced the problem of either expanding greatly their present brine operations or tapping a new source of supply. As the brine operation necessitated extensive well expansions and would produce large quantities of the typical Dow products from the Midland brine, the company rather than upset their production balance naturally preferred to tap a bromine source that was easy and economical to work, unlimited in supply, and would produce no by-products. The sea met these requirements perfectly, and having determined that the bromine content of the Atlantic is virtually constant all along the coast, it remained to find a location where there was no pollution from a large city, no dilution from fresh water rivers, and where the effluent might be disposed of without fear of such dilution. The long narrow sand bar, outside Wilmington, N. C., behind which the Cape Fear River flows into the sea, offered an ideal combination of these advantages.

Besides the alcohol from Deepwater, the chlorine used comes from the R. & H. Division of du Pont, another affiliate of the Ethyl Gas, and it is interesting to note that this chlorine is originally separated from salt at Niagara Falls, in the operation that produces the sodium used in the manufacture of the tetra-ethyl-lead. The sulfuric acid used comes from nearby fertilizer operations in specially designed tank containers below decks on a Company-owned vessel, the "Ethyl Dow," 116 feet long, with 100 h. p. diesel engine.

At the end of the bar, eight miles below the bromine plant, commanding the mouth of the Cape Fear River is Fort Fisher, and the Union soldiers who attacked this stronghold during the Civil War, helped this ultra-modern chemical plant not a little. The trenches they dug were the basis of the canal through which 26,000 gallons of sea water now flow every minute into a settling basin, dug out of a great natural depression caused tens of thousands of years ago when a great shower of meteors bombarded the Carolina coast. All of which bears out Dr. Stewart's statement that "in kidnapping old Father Neptune we had to take every natural and chemical advantage over the old sea king." Production that is slightly over projected capacity the second month of operation is a record that will stand for a long time.

Bromine is not an exclusively southern raw material; but the southern pines, longleaf, slash, and loblolly, distinctly are; and in Savannah are stirring new developments in the better chemical utilization of this natural crop, which many of us have forgotten is the foundation of one of our very oldest chemical raw materials industries. The first year of the first English colony, at Jamestown, Va., the first cargo of

exports back to England included wood pitch, the crude material of our American naval stores industries, which even today control the world's markets for turpentine and rosin.

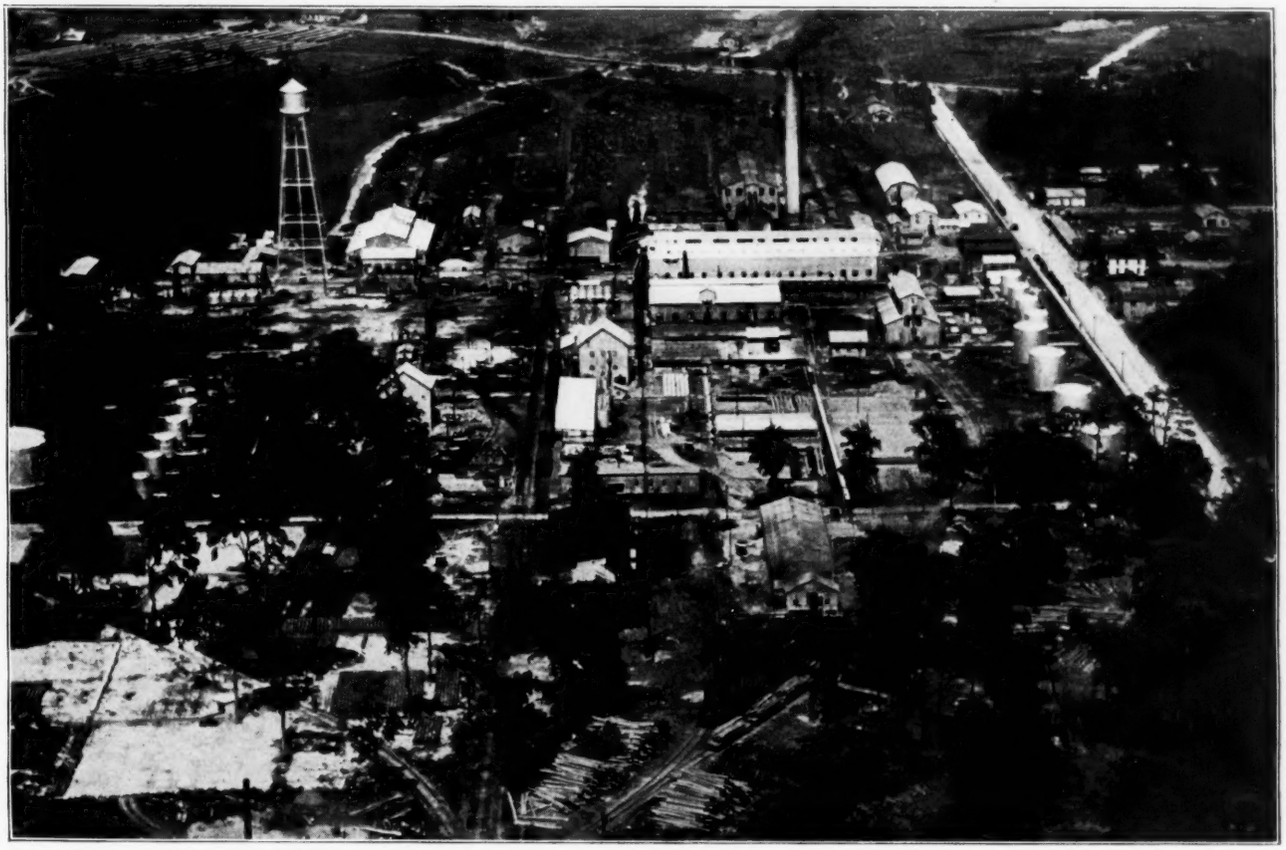
Because of this same pitch, however, it has always been believed that the southern pines were quite unsuited for the manufacture of woodpulp for white or newsprint paper. At Savannah, Dr. Herty has proved that if the southern pine is "caught young and treated rough," that is cut before the heartwood forms, say at from five to seven years, and chipped, digested, and beaten promptly there is no rosin problem at all. He has done it, and W. G. MacNaughton—"Bill" to thousands of friends—thoroughly relishes showing how they are going on and doing it, time and again, day after day, using all sorts of pines and always learning more and more about the best and the quickest and the cheapest way to convert them into good white cellulose.

Technically, one might say, this feat is an accomplished fact. Economically, the transfer of the newsprint paper industry to the South is still an interesting probability.

On the *pro* side is the fact that in five years southern pines are suitable for working while it takes northern spruce from twenty to thirty years to reach this size. When the paper industry becomes more seriously dependent upon reforestation this will doubtless be an unanswerable economic argument. But in the meantime, the industry is firmly planted in substantial buildings, equipped with costly and weighty machinery, close to suitable and still sufficient raw materials, located on clear water streams. I suspect the first southern mill will be either the property of a new company or an addition to or adaptation of some existing kraft paper operation. In the meantime the good work should go forward, for it holds huge industrial possibilities, and some of the many rumors of cellulose for rayon and acetate from southern pines ought to be translated into a fact as plain as the newsprint pulp.

In Savannah, thanks to my confrere, Thomas Gamble, who combines the jobs of publisher of the leading naval stores business paper and of the Mayor of Savannah most skillfully, I enjoyed a conference with a score of leaders among the "gum producers" who make rosin and turpentine by the ancient and honorable processes of extracting the gum from the trees by chipping, collecting in cups and then distilling, in distinction to the "wood producers" who steam distill pine stumps for the extraction of the rosin and turpentine.

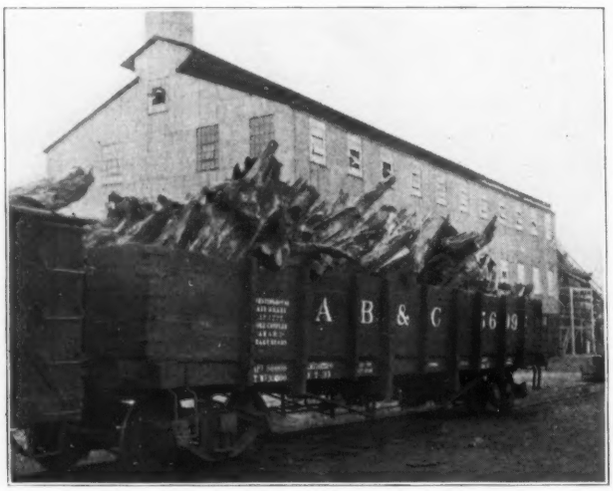
The gum men are wide awake to their position which is not altogether an enviable one. Several of their best, old markets (notably paint and varnish) have been sharply curtailed; their output (difficult to control because coming from many, small independent stills, requiring little investment) holds remarkably



A birdseye view of the wood distillation plant of the Hercules Powder Company, at Brunswick, Ga., producing rosin and turpentine by steam distillation from pine stumps, under chemical control.

constant; their prices (though up somewhat recently) have declined to half of the 1926 levels. At the same time, the wood rosin operations have been expanding, and being large, centralized plants, under strict chemical control, are not only producing cleaner, more sharply defined grades, but also a number of interesting, profitable chemical by-products.

Among the gum producers there is a growing conviction that their future lies in finding chemical markets



The raw material of the wood naval stores industry. Pine stumps in front of the power house at Brunswick, Ga. plant of the Hercules Powder Company.

where, as in the manufacture of the synthetic camphor substitute, their natural products will become the starting point for various syntheses. This very plainly points to better standardization of their products, and may in turn force a solution of their old problems arising out of the small unit methods of production.

Early Attempts in Improving Quality

This is not a new thought. As far back as 1925, Alfred Fendig headed up a group which secured control of 180,000 acres of turpentine woods, and under the name of the Better Rosin Corporation, built a plant, designed by Kloss and Roy (who are now associated with the Hercules wood operation at Brunswick, Ga.), to operate on a continuous evaporation system. This plan was later changed to an adaptation of the French process of batch cleaning and distilling. This plant burned after a short operating life, but A. S. Carr and Bryan Brown are working a similar set-up. It is said that by their methods they are able to raise the quality of their rosin about three grades, which in the case of the very lowest grades represents an increase in price of 50c a barrel, but in the popular H, I, K classes only represents about 5c or 10c. The problem sums up as to the ability of a plant costing say $25,000 and with additional transportation costs to compete with a plant requiring a tenth of this investment.

Hercules at their wood plant have found quite a distinct solution. They work a different raw material, pine stumps, bought on cleared land and hauled in by rail, where they are chipped, subjected to steam distillation, and refined, with the production of pine oil, as well as the better grades of rosin. Furthermore, they are extracting the various chemical constituents of both turpentine and pine oil, and securing about a hundred different products, a number of which are already finding growing commercial application.

PRINCIPAL CONSTITUENTS

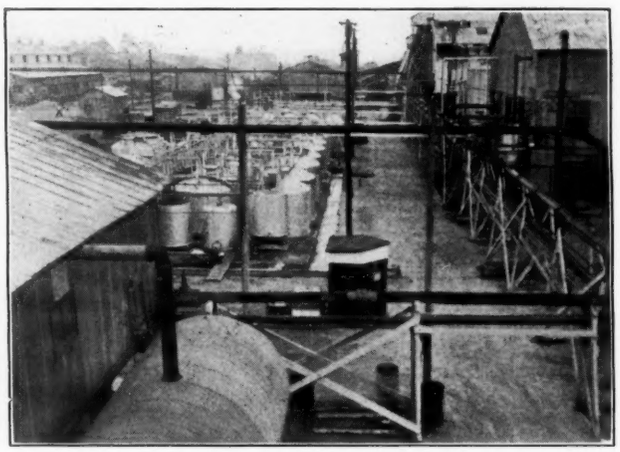
Turpentine

%	(*Hydrocarbons*)	*Boil. pt.*
70	a-Pinene	156° C.
2	p-Menthane	170° C.
25	Dipentene	176° C.

Pine Oil

	(*Alcohols*)	
8	Fenchyl Alcohol	203° C.
12	Borneol	212° C.
55	a-Terpineol	218° C.

This Brunswick plant, its sister-ship at Hattiesburg, Miss., and the Newport operation at Pensacola are furnishing the most uncomfortable kind of competition to the gum producers; but they may be well disguised blessings showing the way out of the ancient and basic difficulties of this industry. Certainly one need not despair of the future. Naval stores have been too long, a too important part of southern economy,



A closer view of the wood turpentine plant at Brunswick, a proof of the advantages of pipe lines that do not need to be buried.

and the materials are too cheap and abundant, and too interesting chemically not to have a very definite place in the chemical operations of tomorrow. They may hold a development similar to the coal-tar industry, where a market for intermediates made the beehive oven obsolete. One of the recent innovations is interesting. Since colonial days rosin has been shipped in wooden barrels weighing about 75 pounds. It is now being shipped in steel one-way-shippers, weighing 15 pounds, with a very considerable freight saving.

Quite a different state of affairs exists down in

Florida at another famous southern headquarters of chemical raw materials, the phosphate rock mines. While four-fifths of our domestic production (normally some 4 million long tons) comes from this region, and consumption dropped a half between 1930 and 1932, nevertheless the average price of "land pebble" for these three years was $3.24, $3.39, $3.13, bespeaking eloquently the stabilizing effects of the ability of an industry to strike some reasonable balance between output and shipments. Furthermore, since the early autumn of last year there has been a steady increase in the demand for rock, both from domestic and foreign buyers.

Origin of Florida Phosphate Deposits

The Florida phosphate fields, centered in Polk Country, lie at the old coast line of a prehistoric sea and consist of a rich phosphatic marl in a fine clay. The deposits are largely from the organic remains of the gigantic mammals of that period and the teeth of sharks and the bones of whales, three-toed horses, and mastodons are not uncommonly found. A commercially workable deposit must be rich enough and large enough and must lie under a thin overburden. The beds run from 600 to 800 feet in thickness and the overburden from 16 to 40 feet, and reasonable expectation is held to be 250 million tons of washed rock.

The mining operation is simple. By drag line the overburden is stripped off, powerful streams of water sluice the rock out of its matrix of clay into pits from which the slurry is pumped to great washers where the phosphate pebbles are cleaned and dried. A recent innovation is the use of a flotation process by the I. A. C. at their mines at Mulberry. This recovers fines lost in the ordinary water washing process.

Besides the I. A. C., the A. A. C. at Pierce, the American Cyanamid at Brewster, the Southern Phosphate at Ridgewood, the Coronet Phosphate at Coronet, the Phosphate Mining Company at Nichols, and Swift at Fort Mead, are operating in this field. Most of the companies have built their own towns, housing their employees and providing them not only with supplies, but also with hospitals, schools, swimming pools, movies, and whatnot of modern life usually lacking in communities of their size.

Cyanamid's Phosphate Operations

After a misty, moisty, and very muddy trip through the fields, we came back to the big, bare office from which H. L. Mead directs the Cyanamid phosphate operations. On the walls are two great maps of Florida and of the Company's property, over by the window an enormous, old-fashioned table desk; around the room four stiff, straight, wooden chairs—all as stark and business-like as a cold chisel. General Manager Mead, who besides mining and selling his product, is lord mayor of the city, judicial authority and spiritual advisor to his 1200 "people," and very obviously granddaddy to all the children of the community, gives you a strong impression of the clean-cut, fit, well-bred efficiency of a British cavalry officer of the Old School and then immediately belies appearances by saying that most of his troubles are due to "army men meddling with business affairs."

"We have been working our men 30 hours during the past three years, thus holding down production,

The first step in the gum turpentine industry. A negro chipping a pine tree—note the cup placed below the wound to catch the sap.

but at the same time keeping our forces at work and giving all some income. Now we have a pick-up, and they would be only too glad to get the wages of 50 hours a week. We have always worked this way, spreading the work during dull seasons and getting the men extra money during the busiest months. But now we must post a 40-hours-only notice, and the men kick at having to share their own legitimate piece of "cake" with floaters. From our own point of view, we dislike not keeping the faith of our old custom of taking care of our own people and sharing good times and bad with them, and it is moreover a serious question how much we can afford to pad our payroll with inefficient men. Our way is proved. It is not only the most efficient, but it is the fairest to our men. But the army man has a thoroughly unbusinesslike conception of labor. He has the make-work notion because he must keep the enlisted men busy. He

Right, H. L. Mead, General Manager of the phosphate operations of the American Cyanamid, whose job requires a variety of talents ranging from miner to salesman, from policeman to judge, and who holds forceful ideas regarding the conduct and well being of an American industrial operation in these days.

Below, hydraulic mining of phosphate pocket. The bucket on the drag line strips nine tons of overburden per bite, and the phosphate rock is washed out of the clay beneath by regulation hydraulic mining operations.

sends two men to a job and hopes to goodness it will take them a day. The industrialist sends one man and hopes it can be done in four hours.

"Most of these Florida phosphate operations are little self-contained communities. The Companies stand almost *in loco parentis*. We run a grade school here and a high school with a principal, nine teachers and an athletic coach, and our students can go straight to Columbia, or Cornell, or any of the big universities, which cannot be said of high schools in rural districts in any state. We are proud of our death rate of 4 per cent., for we work hard to keep it lower than the average of communities with the same industrial risks and the equivalent to our negro population."

One only need drive through the various phosphate towns, with their well painted houses, their neat lawns and attractive public squares, to see the difference between living in them and in the ordinary small southern village. It is very easy to believe that good men, black and white alike, eagerly seek jobs with these companies, and that when one of them falls from grace, his wife and children besiege the office with protestations and pledges. That is the best proof I could find that the mutual interests of men and management are skillfully guarded in the phosphate fields.

To be continued in June with an account of the new alkali and sulfur developments in Louisiana and along the Gulf Coast of Texas.

The Industry's Bookshelf

This Road to Recovery, by John F. Wharton, 191 pages, published by William Morrow & Co., 386 4th ave., N. Y. City. $1.50.

Book is styled "A Primer of Economics for Bewildered Americans." Book in plain and simple language attempts to interpret the changes which are going on, and their future effect on the average citizen.

Chemistry In Relation to Fire Risk and Fire Extinction, by A. M. Cameron, 278 pages, published by Pitman Publishing Corp., 2 W. 45th st., N. Y. City. $2.25.

A practical chemist has applied his knowledge and experience to the question of fire (in chemical and allied industry plants) and to proper fire protection. While designed primarily to give those in the fire insurance business a proper chemical perspective, book will prove valuable to chemical plant managers seeking information on the general subject of fire safety.

Food Products, by Henry C. Sherman, 674 pages, published by The MacMillan Co., 60 5th ave., N. Y. City. $3.00.

Third edition of this broad general study of food and of the chief types of food products is made even more interesting at this time because of the fact that its author has just recently been honored with the Nichols Medal in acknowledgement of his important contributions on the subject of vitamins.

A Textbook of Inorganic Chemistry, by J. R. Partington, 1062 pages, published by The MacMillan Co., 60 5th ave., N. Y. City. $4.25.

One outstanding characteristic of this work is its completeness which recommends it strongly for use in schools where chemistry and chemical engineering degrees are granted, rather than for general science or chemistry courses. A fourth edition has brought subject matter up-to-date.

Lithium Salts and Lithium Ores

By G. H. Chambers and E. G. Enck
Secretary and Director Chemical Production, Foote Mineral Co.

ALMOST every element has certain distinctive properties which eventually lead to commercial uses. Lithium is no exception and, compared to most of the rarer elements, has had a long and commercially important career. The pharmaceutical trade was using lithium salts as early as 1875 and fairly large quantities of the salicylate, benzoate and citrate are still sold for medicinal purposes. Another early use was in the manufacture of lithiated mineral waters. In the year 1900 these were the two principal outlets for lithium and the total world production was estimated to be 50,000 to 150,000 lbs. per year. Almost all of this was produced in Germany from ore mined in the United States. Soon after 1900 the unusual characteristics possessed by these salts led to their introduction into a number of industrial fields. For example, lithium in the form of the hydroxide has been used for twenty-five years in alkaline storage batteries and in 1907 lithium chloride was first used as the important ingredient in aluminum welding flux. Several other industrial applications have been developed in the last few years, not only for lithium compounds but also for powdered lithium ore.

There are four commercially important lithia minerals and all of them occur in pegmatite dikes. Unfortunately, they have low lithia contents and this handicap makes it inevitable that lithia prices will remain high in comparison with the other alkalies, soda and potash. The best lithium ores never carry over nine per cent. lithium oxide.

The United States is the most important producer of lithium minerals and at the present time some ore is exported to Europe. The best deposits are in the Black Hills of South Dakota. Large quantities have also been produced in New Mexico and California. Lithia mines are found in France, Portugal, Spain, South Africa, Canada, Germany, Sweden, Czecho-Slovakia and Australia but the tonnage of ore produced in the United States is larger than the combined output of all the countries named.

Amblygonite—The most sought-after lithium ore, a complex lithium aluminum fluo-phosphate. Manufacturers of lithium compounds prefer it because of its higher percentage of lithium oxide. Theoretically, amblygonite should contain 10.1 per cent. lithia but analyses on carload lots received at the plant of Foote Mineral Company in early 1934 showed the following lithium oxide contents: 8.46 per cent., 7.90 per cent., 8.31 per cent., 8.58 per cent. and 8.24 per cent.

Amblygonite occurs in large crystals or rounded masses. Figure I shows a miner pointing to a boulder of amblygonite about two or three feet in diameter. The color of the mineral is white but the crystals are usually covered with a brownish-yellow alteration product which helps to identify it. A fractured surface of amblygonite has an opaque, resinous lustre and the mineral is quite tough and hard (hardness of 6 on Moh's scale). The mineral is so compact that it takes much drill-sharpen-

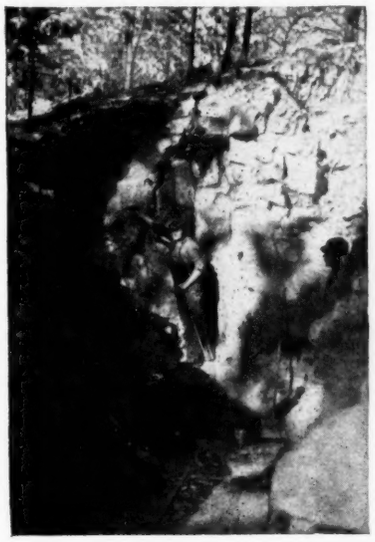


Fig. 1—Miner pointing to amblygonite.

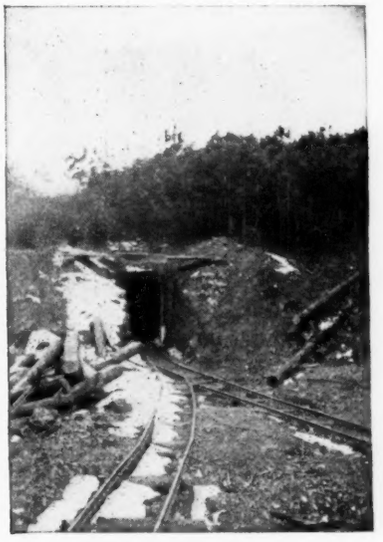


Fig. 2—Entrance to amblygonite mine.

ing and profanity to bore the holes for the dynamite. The ore is blasted and then sledged into pieces which range from one foot in diameter down to a half inch. It is carefully hand-picked by the miners and loaded into buckets or mine cars which bring it to the surface. Figure 2 shows the entrance to the tunnel of the largest amblygonite mine in the United States. It is not unusual to find amblygonite logs in this mine which are six feet in diameter and ten feet long, with an estimated weight of 26 tons. The mineral is usually surrounded by quartz, feldspar, mica and occasional crystals of tourmaline, columbite, spodumene, beryl, and lepidolite.

Spodumene—During the past thirty-five years spodumene has been the principal source of lithium compounds in the United States. It is a lithium-aluminum silicate and the pure mineral should theoretically contain 8.4 per cent. lithium oxide. The actual lithia content of commercial ore is usually between 4.57 per cent. and 7.5 per cent. In the Black Hills spodumene crystals attain high size and crystals having a length of ten feet are common. Figure 3 shows one of the authors indicating the width of a moderate sized crystal. These logs occur at all angles and in all sizes in the pegmatite body. Figure 4 shows a small bin of mined spodumene and part of the open cut in background. Spodumene crystals show very good prismatic cleavage and smooth prism faces. The mineral is white, ash-gray or greenish-white in color and has a vitreous, sub-translucent appearance. In some localities a great deal of altered or weathered spodumene is found. This material is soft and spongy and is of no commercial value as it contains almost no lithia.

Spodumene is used in making lithium salts and the ground ore is now finding a market in several branches of the ceramic industry. It does not flux as easily as lepidolite but contains more lithia and its composition is less complex. It is believed that its use in electrical porcelain, glass and special glazes will soon increase. Spodumene is now being tested in enamels and refractories and may also prove to be of value in these fields.

Lepidolite—A lithium-aluminum silicate belonging to the mica group. It often occurs in massive columns or large boulders which can be mined cheaply. Lepidolite is usually pink, lavender or violet grey in color and the micaceous scales glittering in the ore make it easy to identify. In commercial quantities lepidolite carries from one per cent. to six per cent. lithium oxide. It is interesting to note that the mineral sometimes contains from 0.25 per cent. to 0.75 per cent. caesium and rubidium but at the present time richer ores are used as a source of these elements.

The Germans, who lack good lithium ore, have tried to make use of an abundant supply of low grade lepidolite in the Harz Mountains. Although the ore contains only about one per cent. lithium, they have developed a large scale process which seems to be successful. Recently they have been using a three per cent. lepidolite from Bohemia.

Rather large tonnages have been mined in California and New Mexico and there are exceptionally good deposits in South Dakota. There are also large quantities in Southwest Africa, some of which is now being shipped to the United States.

Thousands of tons have been sold to the glass industry but in the last few years this use has declined. Some special glass batches still contain lepidolite as it imparts several valuable properties to the glass. It reduces the coefficient of expansion slightly and improves the strength of the glass. As it contains lithia and large percentages of potash and fluorine, it is a strong flux not only in glass but also in electrical porcelain, terra cotta glazes, special refractories and enamel. It is now being used or tested in all of these fields.

Triphylite-Lithiophylite—These twin ores are phosphates of lithium, iron and manganese and differ from each other only in the proportion of iron and manganese, tryphylite containing more ferrous oxide and less manganese than lithiophylite. These minerals are supposed to have lithium oxide contents as high as 9.50 per cent. but are easily altered. The lithium may be leached out and this is illustrated by a recent analysis on a two ton lot which showed only 0.82 per cent. lithia. The minerals occur in small nodular masses in pegmatites. Figure 5 shows several dark nodules of lithiophylite embedded in white quartz and feldspar. The pick points to the best defined mass and indicates its relative size. These are the only lithium ores which we have found to be directly soluble in acids.

Fig. 3—Indicating the width of a spodumene log.

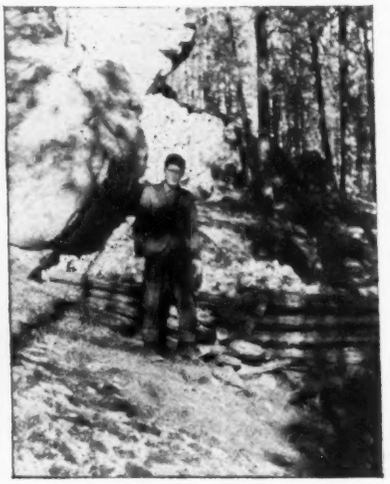


Fig. 4—A bin of mined spodumene.

Typical Analyses of Lithium Ores

	Amblygonite per cent.	*Spodumene* per cent.	*Lepidolite* per cent.	*Lithiophylite* per cent.
Li_2O	8.48	6.78	4.65	9.26
K_2O	0.30	0.69	10.33	....
Na_2O	1.63	0.46	0.13	0.29
SiO_2	5.16	62.91	52.89	....
Al_2O_3	22.96	28.42	26.77	....
Fe_2O_3 or FeO	0.019	0.53	0.19	13.01
MgO	Trace	0.13	0.31	....
CaO	0.15	0.11	0.92	....
P_2O_5	54.42	....	....	45.22
MnO_2	None	....	0.59	32.02
F	2.67	....	3.68	....
Loss on ignition	4.80	0.28	0.66	....

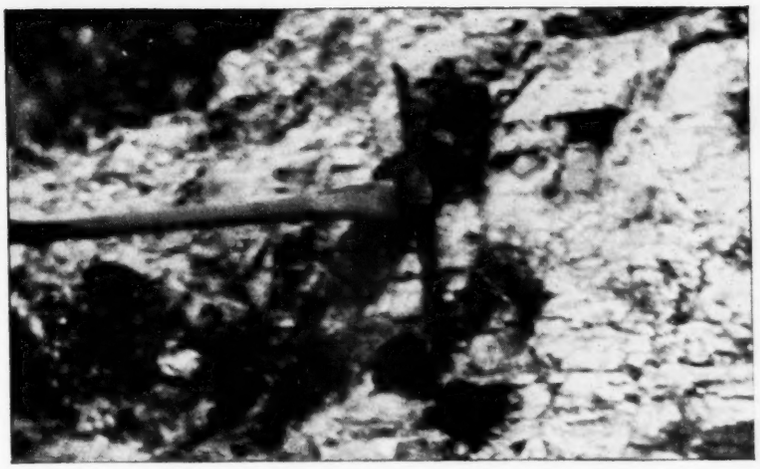


Fig. 5. Lithiophylite embedded in white quartz.

The important salts produced from these four minerals are the carbonate, chloride, hydrate and fluoride. The metallic lithium content of these compounds is quite low as lithium and has an atomic weight of only 6.94 and a specific gravity of 0.59. Few technical men realize that it is the lightest of all metals as it has received less publicity than beryllium, magnesium and aluminum.

Lithium Carbonate

The carbonate was the first compound of lithium to be made. Its "strange property of requiring more acid to neutralize it than soda" lead the young Swedish chemist, M. Arfvedson, working in the laboratories of the famous Berzelius, to discover lithium. During the analysis of a new mineral, Petalite, he found about "three per cent. of an alkaline substance" which he first supposed to be soda. Further work convinced him that he had discovered a new substance, lithium. This was in 1800. Several years later Sir Humphry Davy reduced the carbonate with his voltaic battery to obtain the first metal. Since that time the carbonate has always been the most important lithium compound.

Lithium carbonate is an anhydrous white crystalline powder, and is decomposed by acids with the liberation of CO_2. Its solubility in water is very low—decreasing as the temperature increases. At 20° C., 1.31 gms. is soluble in 100 cc. and at 100° its solubility is .71 gms. In boiling water it decomposes in the same way as Na_2CO_3 but more slowly. The melting point is 618° C. and above this there is a partial decomposition into the oxide. The dissociation pressures in mm. as reported by Howarth and Turner are:

750° C.—0 : 800°—3.1 : 850°—8.1 : 900°—17.4 : 950°—32.7 : 1000°—56.2 : 1100°—134.4.

Typical analyses of the two commercial grades of the carbonate are as follows:

Technical Grade		*N. F. Grade (by N. F. tests)*	
Li_2CO_3	95.29%	Li_2CO_3	98.3 %
CaO	0.28%	Insoluble in dil. acetic	
Al_2O_3	nil	acid	0.13%
Fe_2O_3	0.08%	Heavy metals	Trace
Na_2SO_4	2.62%	Fe and Al	"
P_2O_5	0.10%	Other Alkalies	"
H_2O	0.25%		

The most deliquescent inorganic compound known is lithium chloride. It crystalizes as white octahedral crystals and has a sharp saline taste. The fused salt is slightly grayish in color with a melting point of 614° C. and a boiling point of 1382° C. A saturated solution has a boiling point of 168° C. Between 13-97° the specific heat is .2821. Its solubility in water is:

Temp. °C	0	20	60	80	100	140
Gms. in 100 cc. H_2O	67	78.5	103	115	127.5	139

It is soluble in many organic solvents such as alcohols, aldehydes, and ketones as well as phenol and some fatty acids.

It appears on the market in two grades—crystals and fused. The salt is so hygroscopic that it must be packed in air-tight, moisture-proof containers. It is also produced in the form of a brine with a specific gravity of 1.2 containing 32-34 per cent. lithium chloride. A typical analysis of a technical grade of fused lithium chloride shows:

LiCl	96.94%
NaCl	1.08%
NH_4Cl	1.11%
Fe_2O_3	0.003

The most insoluble commercial salt of lithium is the fluoride. At 18° C., only 0.17 gms. will dissolve in 100 cc. of water. It is a fine white crystalline powder. The melting point is 870° C. and specific heat is .3735.

Under proper conditions the normal fluoride can be produced with an acid reaction. This property is most desirable in welding and soldering fluxes. This normal fluoride is not to be confused with the acid fluoride (LiF.HF) which is quite soluble in water and has a sharp acid taste. This compound is broken up at 105° C. into the normal salt and hydrofluoric acid.

A typical analysis of technical lithium fluoride shows:

LiF	96.35%
NaCl	1.20%
NH_4Cl	0.24%
Fe	0.04%
MgO	Trace
Loss @ 300° C. (less NH_4Cl)	1.92%

Because of their low melting point and great affinity for aluminum oxide, both lithium chloride and fluoride are finding use in fluxes for non-ferrous welding, especially aluminum. A typical flux mixture as specified by the U. S. Navy is:

LiCl	24%
NaCl	32%
KCl	24%
NaF	20%

Lithium fluoride is rapidly replacing the chloride in welding because of its non-hygroscopic nature.

Other Salts

Lithium Hydrate—A white needle-like salt with the formula, $LiOH,H_2O$. When exposed to the air it loses its one molecule of water but at the same time absorbs CO_2 from the air. It is quite soluble in water and slightly soluble in alcohol.

Lithium Nitrate forms transparent deliquescent needles which have a solubility of 34 gms. in 100 cc. H_2O at 0° C. An interesting double compound of lithium and barium nitrate containing about two per cent. lithium nitrate has recently been produced. It was found less soluble in water than either barium or lithium nitrates and was only slightly deliquescent. A recent study of its properties indicates a possible use in ammunition primers. Lithium nitrate does not seem to form a well-defined double salt with strontium nitrate, but a mixed salt of lithium-strontium nitrate has been investigated and appears to have possibilities in red pyrotechnic flares.

Glass and Ceramics

Lithium has a number of outstanding advantages in a glass batch. This was recognized in 1916 by W. C. Taylor who patented the use of lithium in certain types of borosilicate glass. Taylor and other investigators discovered that lithium oxide is a powerful flux and reduces the fusion temperature of glass to a marked degree. In a recent study on glass melting, W. E. S. Turner found that lithium carbonate dissociates at a temperature 200° to 240° C. lower than sodium or potassium carbonates. Turner also found that lithia glass has the lowest melting point and lowest annealing temperature of the alkali glasses. A further advantage of lithium in glass is that it reduces the coefficient of expansion. This is due principally to its low atomic weight which theoretically permits the substitution of 1 lb. of lithium carbonate for 3 to 5 lbs. of the other alkalies in the glass. This reduction in the alkali content has the effect of reducing the expansion and increasing the stability of the glass.

Very small percentages of lithia sometimes have a decided effect on the physical properties of ceramics. This was shown by W. C. Taylor in his borosilicate glass patent mentioned above and by Mrs. Bartlett and R. R. Thomas, Jr. in their work on a lithia-zirconia porcelain. A sample containing 1.9 per cent. Li_2O had a much lower coefficient of lineal thermal expansion and greater resistance to thermal shock than a sample containing 1.35 per cent. Li_2O. Lithia seems to be a crystallizing agent in ceramics but the addition of alumina will neutralize this effect. It is said that lithium glass is more permeable to X-rays than soda glass and that it has a lower refractive index and lower color dispersion than optical glass made with heavier elements.

In a properly balanced ceramic glaze, lithia imparts a very smooth surface, better fluidity and a lower coefficient of expansion. For these reasons it is used in the glaze on some refractory crucibles. Moderate quantities are employed in some vitreous enamel colors where lithium probably has the same advantages that it has in glass.

Miscellaneous Uses

Lithium borate has been used in dental cement and other lithium salts have been tried in photographic film and in phosphorescent pigments. An arc-welding composition containing lithium zirconate has been patented and lithium chloride has been employed in certain soldering fluxes. It is interesting to note that the addition of lithium nitrite to common salt is claimed to improve the curing of meat, particularly "frankfurters and ham." These minor uses for the element certainly cover a wide range of activities. There seems to be some interest in lithium compounds as catalysts in the synthesis of ammonia and as electrolytes in the manufacture of alkali and alkaline earth metals. Lithium chloride and fluoride have been suggested as a flux to protect molten metals such as magnesium. It is said that the blackening of electric light bulbs can be prevented by spraying the filament with a lithium salt. The hydroxide has been used in mercerizing sulfite cellulose for rayon and in purifying helium and other rare gases. The chloride is valuable as a dehumidifier. Lithium carbonate and lithium-strontium nitrate produce the best red flares in fireworks and are used when color in important.

Lithium has not had a spectacular history but the quantities used during the past thirty years are surprisingly large. The use of lithium salts in ceramics, medicine, welding, fireworks and batteries may suggest a number of other possible applications. And as there is an adequate supply of lithium ore, there is no reason why it should not enter new fields.

Non-Reflecting Windows

The reflectionless window is beginning to be widely used abroad in shops. It is made of a concave sheet of glass so constructed that the light from all sources incident on it is reflected to two black boards arranged one at the top and one at the bottom of the glass. The eye of the observer looking at the glass from in front is completely unaffected by any of the reflected light, the result being that it is very difficult to believe that there is any glass between the objects displayed and the observer. The prospective buyer therefore views the goods more clearly and is not distracted by images. It is also claimed that an appreciable saving in the cost of artificial lighting is effected, since every lamp in use is able to give its full illuminating value and does not have to compete with the disturbing effects of outside rays reflected by the window. The new window is applicable to all shops whether new or old, and for maintenance costs no more than an ordinary plate-glass window.

Fluorescence Tests in Chemical Industries

European Chemists make increasing use of analytical quartz lamp for rapid routine testing.

By C. H. S. Tupholme

FROM the legal point of view, the onus is upon the buyer of a commodity to ascertain that it is genuine or comes up to specification, and this applies to food, raw materials and finished products. For this and other reasons continual effort is directed toward providing the chemical industries with some reliable and rapid means of carrying out routine tests, and the most popular now is the analytical quartz lamp, which, since it was first introduced to industrial chemists only a few years ago, has commanded an increased sale in Britain and on the Continent of Europe.

A large number of commodities can be tested instantaneously with the analytic quartz lamp. This lamp develops a powerful beam of invisible ultraviolet rays, which have the peculiar property of causing many substances to fluoresce in striking colors. The color in each instance is characteristic of the composition, and an imitation or substitute will not reproduce the same fluorescent color. The test results must, of course, be read in conjunction with physical and chemical tests, because the fluorescence test cannot be taken alone as a criterion of genuineness. On the other hand, it does provide an instantaneous visual test of extremely wide application, and it will often give, in a few seconds, a result that will save hours of elaborate and costly analysis.

The Hanovia Lamp

One of the most used lamps for this work is the Hanovia, which employs mercury arc quartz burners, the beam from which is passed through a filter of special glass which absorbs visible light. The invisible rays which pass through this filter give very brilliant fluorescent effects. The examination of a product does not demand a dark room, though direct daylight is screened off, and ordinary fluorescence tests are carried out with the naked eye, goggles only being necessary for direct observation of the arc. Each outfit is adjusted to operate with the prevailing character of the electric supply, and no special wiring is necessary. The lamp is employed in various models.

The lamp is widely used for testing drugs and chemicals. The more important therapeutic alkaloids come, mostly, under the heading of fluorescent materials, and they can be tested either as powders or tablets. By the process of capillary analysis, and examining the strips of paper so obtained in the dark rays, an extraordinarily sensitive and reliable process for the identification of these alkaloids is available, each alkaloid showing a number of characteristic colored zones. Even in the most dilute solutions, such as do not react to delicate chemical tests like Meyer's reagent, these zones are reproduced. Morphine, for example, can be recognized at a strength of 0.001 mg. per 30 cc. of liquid. Deterioration due to storage or light can also be detected. One advantage is that the alkaloidal content can be determined even in colored extracts or tinctures. Chlorophyll is readily detected in tinctures by its characteristic red fluorescence, and the different types of chlorophyll can also be differentiated. Quinine salts give a powerful blue fluorescence which makes it easy to test preparations containing them.

Some chemists have used the lamp to trace small amounts of alkaloids in saliva, human milk and amniotic liquid. Even after five days certain drugs have been detected and a very good estimation of the amounts present were made, the amount of liquid required being two cc. Turkey rhubarbs have a reddish-brown fluorescence, all other varieties showing a violet color, and the admixture of only one per cent. rhapontic is detectable. With drug plants, sections through the stems, fruit and rind show the characteristic fluorescence of the substance. Commercial orange flower waters are commonly evaluated with respect to their age.

One worker has used the fluorescence test for arsenic in amounts down to 0.0000001 gm., while another has used it for boron in amounts as small as 1/50 mgm. The lamp is being used successfully for the testing of essential oils and other constituents used in perfumery and cosmetics, and a specific test has been evolved for sesame oil, sensitive to one per cent. of the oil.

In view of the recent dispute on the dangers to health arising from the use of aluminum vessels for the

preparation of food, and also from the use of preservatives, very sensitive tests with the quartz lamp have been devised. One chemist focuses the rays from the lamp at an angle of 30 deg. on a capillary tube containing the test liquid on the microscope stage, and a 1:1000 solution of aluminum can then be detected by fluorescence. Another chemist has detected sulfites, using the fluorescence of quinine sulfate, corresponding to 0.25 mgm of sulfur dioxide. One part of salicylic acid in 25,000 parts of milk gives a very clear violet fluorescence under the lamp.

If slag breeze is required for making ballast or concrete, its constancy of volume is naturally of critical importance. Hitherto an authoritative judgment regarding the stability of such material has only been possible after practical experience. Microscopic investigation of slags for their liability to decompose is very difficult and complicated. The analytic quartz lamp has come to the rescue here for the differentiation between stable and unstable slags. Durable specimens placed under the ultra-violet rays show a dark or bright violet fluorescence on newly-broken surfaces. If any tendency to weathering is present, whitish-yellow specks will show on the older broken surfaces. Specimens with a tendency to decompose exhibit numerous spots or flecks of yellow, reddish or cinnamon brown, on the violet background. The decomposition of blast furnace slags and Portland cement clinker is caused by a change of the alpha and beta forms of bicalcium sulfate into the gamma form.

Application to Tanning Extracts

As a general rule, aqueous extracts of natural vegetable tanning materials (dilutions of 10^{-4}), and also sulfited extracts, do not fluoresce under ultra-violet rays, yet the most important artificial tanning agents, sulfite cellulose lyes, give very distinct and characteristic fluorescences, even in dilutions of more than 10^{-5}. In mixtures, notwithstanding the extinguishing effects of the natural dyestuffs, the fluorescence of an artificial admixture present in amounts up to 10 or 20 per cent. is always traceable with absolute certainty.

In a few cases the natural tanning agents exhibit slight fluorescence (e. g., quebracho, Tizera, pine bark, eucalyptus, and Donga), but in intensity, color and character this is quite distinct from the artificial. With the solutions the addition of acids or alkali effects such striking changes in the fluorescent appearance that it can be used for identification of the natural dyestuffs named. A further means of test, which serves for a large number of tanning materials, is the very characteristic "fibre fluorescence" (adsorption of the material on wool or other adsorbents). By this method it is even possible to make quantitative determinations of quebracho extracts and other vegetable tanning extracts.

Fibrous materials of vegetable origin show, in general, a yellowish fluorescence, and those of animal origin a dark bluish tint. Some workers grade yarns tested according to their colors under the lamp, bleached wool being the strongest and unbleached mercerized Egyptian cotton the weakest. Manila fibre can be readily picked out in ropes, and it can easily be seen whether the cotton has undergone any process whatever as this invariably affects the fluorescence. Imitation dyed Egyptian cotton can be distinguished from the genuine by its stronger fluorescence. The detection and destruction of mildew on wool is readily carried out, and the detection of damage by iron mold, oil spots and chemical treatment is extremely easy.

Some plants use a one per cent. solution of Benzopurpurin 10B to stain cloth prior to examination under the lamp, when chemical, mechanical and light damage may all be differentiated. With cloth finishes mineral oils show very strong fluorescences; next come albumins, the well-known process based on the sulfonaphthalic acid or its salts, and the free fatty acids and their ethyl esters; waxes usually show a stronger fluorescence than mineral oils, while vegetable oils are comparatively weak.

Detection of Artificial Silk

Artificial silks may be recognized under the lamp in a much shorter time than by any other means and are easily differentiated from real silk. In the silk worm industry grasserie may be detected by a yellow fluorescence very much sooner than in other ways. Another interesting point is that unhealthy worms do not fluoresce, so that they can be eliminated. (The writer does not know what the effect of the ultra-violet lamp will be on silk worms, and assumes that the worms need not be fitted with goggles). Rayons treated with ammonia, sodium hydroxide and soap are readily differentiated, and cellon can be distinguished from Cellophane by staining and examination under the lamp.

The lamp has been widely used to test dyes, and small differences in shade, not visible to the naked eye, are readily seen. Inequalities in dyeing on cotton yarn, which are imperceptible in daylight and only become apparent on weaving, are determined. Mixed dyes, perfectly uniform in appearance in ordinary light, show up as mixtures under the lamp. Spots of oil that would interfere seriously with dyeing or bleaching are detected, and a method has been worked out for the actual estimation of the amount of oil. The testing of dyes under the lamp has the advantage that the fluorescence is given chiefly by the dye, and the differences in intensity and color show immediately the condition in which the dye has been taken up by the threads.

Other chemicals on which the lamp is being used include linseed oils, gums, waxes and lithopone, rubbers, fuel oils, photographic chemicals, and a large number of foodstuffs. It is also being used by the police to detect check forgeries, and by philatelists to ascertain the genuineness or otherwise of stamps.

Chemical Training for the Future Business Man

By John A. Timm
Asst. Prof. Chemistry, Yale University

MANY have been the discussions among groups of alumni, returned for a reunion at their alma mater, as to what courses they should have taken or omitted when undergraduates. Not infrequently there are to be found in such groups men who have found their way to sales or administrative positions in a chemical or allied industry whose advancement has been slow and whose positions are insecure because of the lack of an adequate science background. Salesmen who cannot answer questions of a simple technical nature and executives who cannot appreciate and take proper advantage of the technical reports of their research laboratories are at a decided disadvantage. As a result many professional chemists have been serving in purely non-technical capacities and in many instances with unhappy results due to a lack of business training or of interest in their non-scientific jobs. There is a need, therefore, for graduates of liberal arts colleges whose undergraduate preparation has included not only the proper training in economics but also science courses designed to meet their peculiar needs. These should not be of the type taken by the chemistry majors. The preprofessional student needs to be trained in the tools of his science and to acquire the proper factual background. They should be rather courses in which the philosophy of the science, its research methods, the application of its theories to the development of natural resources, the elimination of waste, the improvement of products and processes, and the interrelatedness of its industries are emphasized. Such courses are being offered in chemistry in many of our colleges and universities. The author has been interested in their development during the past six years and has been delighted to see several of his former pupils apparently succeeding in non-technical positions in the chemical industry.

The pandemic, or cultural, chemistry course offered at Yale emphasizes the philosophy of the science. Only by an understanding and an appreciation of the experimental method by which facts are discovered and of the use of theory to interpret the known facts and to suggest the discovery of others, can the problems of the research laboratory be understood. The fundamental theories of the structure of matter are studied in some detail. The kineticmolecular theory is derived from a study of the behavior of gases, liquids and solids and then applied to the study of vapor pressure, freezing and boiling points, and critical phenomena. Here the opportunity is presented to discuss such practical applications as those of air-conditioning, the liquid air industry, "dry-ice," and artificial refrigeration. The theories of the structure of molecules and of atoms as studied by both physics and chemistry are next considered. Not only is the entire philosophy of chemistry based on these theories but also incidentally many applications can be mentioned of the facts upon which they are based. For example, spectroscopy has not only given the physicist a powerful means of attacking the problems of atomic structure, but it has also given us the neon lamp and airplane-landing-field beacon. X-rays can be used not only to determine the structure of crystals but also to detect flaws in metals. A study of solutions and of the theory of electrolytic dissociation leads to the discussion of such topics as "anti-freeze" compounds, alloys, colloids, electrolytes, pH and its determination, etc.

The nature of chemical reactions and the factors which influence reaction-velocity suggest such topics as the application of the mass-action law to ammonia-synthesis and the industrial use of catalysts.

The nature of combustion leads to a discussion of fuels resources. Here coal carbonization, "cracking," catalytic hydrogenation, synthetic methanol and others are discussed. A study of corrosion suggests metallurgy. The heavy chemical industries, nitrogen fixation and fertilizers, the electrochemical and ceramic industries are studied.

A study of the nature of various types of organic compounds is applied to a discussion of foods, vitamins and hormones, cellulose products, sugars, fats, dyes, drugs and explosives, and finally of the service chemistry has rendered medicine.

This brief summary of the content of a typical pandemic chemistry course will give some idea of the training offered. The majority of its students are interested and acquire, we hope, a respect for and an appreciation of the scientific method together with some practical knowledge of the chemical industry. Whereas for the most part this information may be of purely cultural value, nevertheless in many instances it can be of great practical use.

U. S. Imports Potash Salts, 1933

Potash salts imported for consumption into the United States in 1933, according to the Bureau of Foreign and Domestic Commerce, amounted to 479,430 short tons, with an estimated equivalent of 165,124 short tons of potash. This represented an increase of 45 per cent. in gross weight over the imports for 1932 (330,964 tons). Eighty-nine per cent. of the gross imports were used chiefly in fertilizers, and this product—425,571 short tons (K_2O equivalent approximately 142,360 short tons) valued at $8,351,428—increased 48 per cent. in gross weight and 46 per cent. in value over 1932 (287,929 tons gross weight, 96,170 tons approximate equivalent in K_2O valued at $5,711,347)

Guiding Industry By Means of "Right Prices"

By W. L. Churchill
Vice-President, John R. Hall Corporation

WITH many business concerns adequate profits are largely a matter of accident. This is especially true of chemical manufacturing, where prices are often fixed by world-wide conditions, where new developments are constantly taking place, and where plant equipment may at any time become obsolete by the invention of a new process.

Under specially favorable circumstances, the average American firm will make money enough to provide suitable rewards for the services rendered by all the organization—management, labor, and the owners of invested capital—but, broadly speaking, such earnings are not normally made. Proof lies in the statistical record that only four per cent. of American business concerns now in existence have carried on for more than thirty years without reorganizations that have spelled losses to the owners.

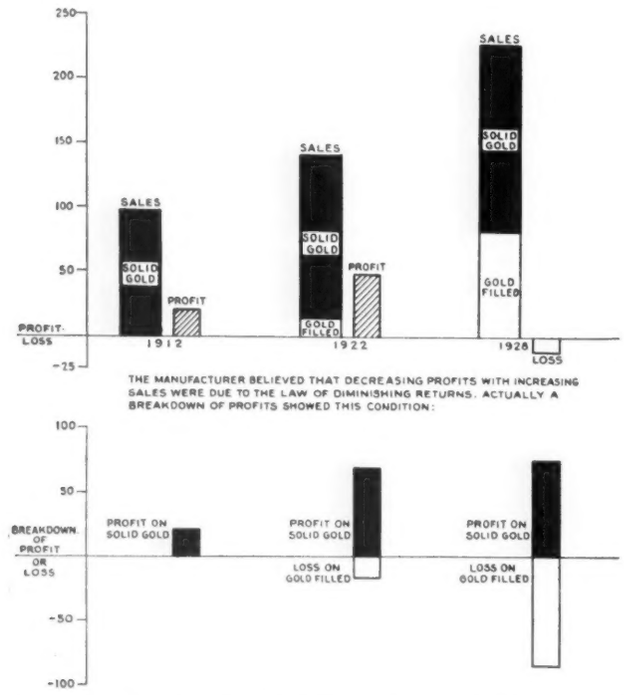


Figure I. Effect of price distortion, where a manufacturer of solid gold rings (correctly priced) added a line of gold filled rings (underpriced).

There are, of course, many ways in which a business can lose money; but a common one is the very general custom of our executives, when directing the operation of their companies, to think in terms of *costs* and not of *profits*.

All competent business men endeavor to get some idea of the cost of the products they manufacture or the services they render. The means employed for this purpose vary all the way from some simple rule-of-thumb procedure to the most elaborate of cost finding systems. But however the figures may be secured, they are used as a guide in determining the policies of the business. Products, or services, which can be sold at prices attractively higher than their costs, are pushed, while sales where prices seem to be too low are discouraged. This method is fundamentally sound. In practice, however, it often leads to erroneous conclusions. First, cost as ordinarily calculated represents only a small part of the expense required to produce and sell the product, and, therefore, leaves too many important factors to be roughly (and perhaps inaccurately) estimated, or neglected altogether. Secondly, the data by which costs are determined may not be based on normal operating conditions, so that the resulting figures may be quite defective as standards of reference.

A simple illustration will make clear what is meant by "thinking in terms of costs and not of profits," and also some of the consequences of this practice. A manufacturer of solid gold wedding rings, worked out a schedule of prices based on their factory cost (material, labor, and other factory charges) plus a definite percentage of this cost to cover overhead and profit. He enjoyed a profitable business for many years, and then decided to add a line of gold-filled rings, which he priced by the same method. His business expanded but his profits began to diminish. Some years later, he found that though his sales volume in all lines was greater than it ever had been, he was actually "in the red". He had estimated his overhead and profit requirements on the basis of his factory cost, which, as usual, included the cost of materials. But the cost of the material that went into the filled rings was only a small fraction of the cost of

the material going into solid rings, so that the overhead figured on the filled rings was much too small. He therefore lost money on his filled ring line—though according to his cost accounting system he made a profit.

These facts are charted in Fig. 1, which shows how the profits from the sale of solid rings were gradually wiped out by the losses on the filled rings.

This same manufacturer got into a different kind of trouble when he attempted to market a line of platinum rings. He set the prices for this new line by his original "cost plus" formula. But for this line, the cost of material was much higher than for his solid gold

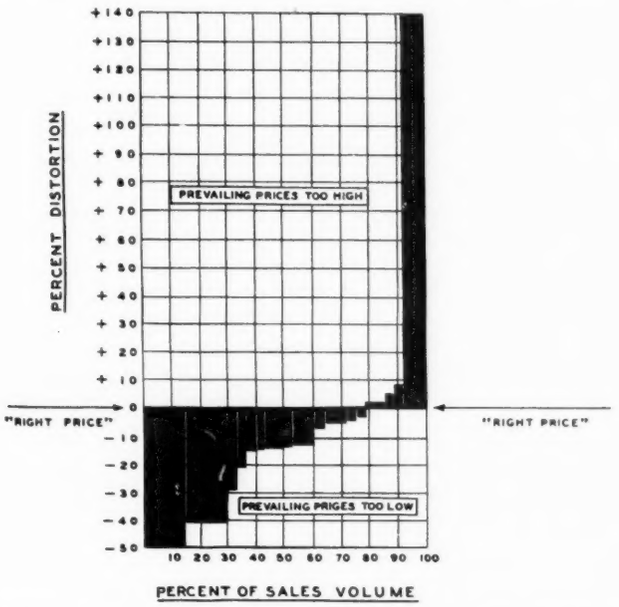


Figure II. Distortion in prevailing prices. Manufacturer of roofing products—seventeen items.

line, and consequently, the prices he thought he had to get for his platinum rings were far too high, and he could not meet competition. Evidently, if he had thought less about costs and more about profit, he could have successfully sold gold filled and platinum rings as well as his solid gold products.

In this simple case, the fallacy seems obvious and easily corrected, but many concerns commit precisely these same errors with product after product, thereby constantly losing money on some items and shutting themselves out of profitable markets for others.

Costs vary with the proportion of the capacity of a plant actually in use. At 80% of capacity, the cost of a given product is materially less than it is when only half of the plant is busy. In many cases, the capacity factor on which costs are based is too high—it represents hopes, not the cold fact of actual normal accomplishment. The result is cost figures that are deceptively low.

The combined tendency of these, and similar errors is to cut deeply into profits. Managements, relying on apparently infallible mathematics, fail to locate the true cause of their difficulties and lay the blame on their sales departments, the government, or anybody

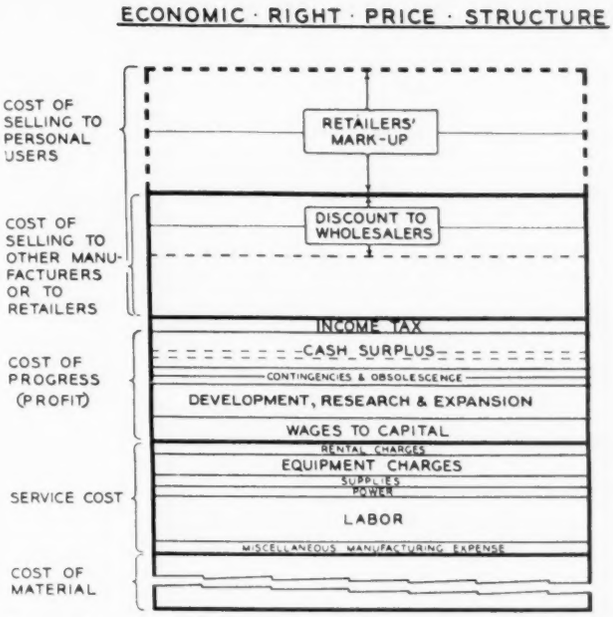


Figure III. Typical structure for a wide variety of manufactured products.

or anything except their own fundamentally wrong guiding data.

The remedy is to abandon, for the purpose of controlling policies, costs which tell only part of the story and that, too often, inaccurately, and to substitute for them prices that tell the whole story correctly.

An example of a practical application of this method is shown graphically in Fig. 2. In this chart, the base line ("zero price distortion") is what is known as the "Economically Right Price," which has been determined for each product that this manufacturer turns out. In computing this price, there is included in it all the elements needed to enable a company to remain continually in business. It is the minimum price that must be secured for each product if the company is to produce, sell, grow, and properly reward its workers and investors.

This "Right Price" having been determined for a product, it is compared with the price actually being received for that product. The variation can be conveniently plotted on a chart such as Fig. 2.

In this particular case, it is shown that 14 of the manufacturer's 17 items were priced below the "right" price, and four of them above this price. The extreme variations are 50% too low, and 140% too high.

In using this chart as a guide, the basic fact is that if each product were sold in normal volume at the "right" price, the company's operations as a whole would be sufficiently profitable to pay dividends at a given rate (say 6%), maintain its plant in first class shape, pay normal wage rates, carry on needed research work, etc.

When sales are made below this price, some of these things cannot be done. But they are all vital to the continued existence of the company. Therefore, sales below the "right" price must be avoided.

Each case must be considered individually. Sometimes an increased price can be obtained by applying

greater sales effort; sometimes the quality can be improved so that a higher price is justified; sometimes costs can be reduced; sometimes the line should be dropped; and there are various other possibilities for management to consider. When a product must be sold below its "right" price in order to "complete a line," the losses involved should be frankly added to the selling expense of the articles thereby aided. If this policy is pursued, frequently the sales department changes its mind as to the "necessity" of the product, or the impossibility of securing the "right" price for it.

When a large proportion of a firm's products or services are being sold below "right" prices, danger threatens, *no matter what the books say*. In extreme cases, where it is impossible to rectify the situation, it is better to liquidate the company at once, rather than dissipate the assets.

When prices being received for products are above the "right" prices, the management is called upon to consider problems of a different nature.

Occasionally, such high prices represent an extra reward for a superior service, and are therefore justified and should stand. More often, however, the management must decide whether or not a reduction in price would significantly increase the amount of products sold, thereby increasing the total profits received. They must also, in these days, consider the public reaction to the sale of important and widely used products at prices considerably above those that can be justified as "fair," and, therefore, result in what may be popularly regarded as "exorbitant" profits.

Most firms, whose prices have been analyzed along the lines indicated, are found to be charging too much for some items and too little for others, and it not infrequently happens that the excess profits on the over-priced goods make up for the losses on the under-priced goods. Such was, in fact, the case with the firm whose prices are shown in Fig. 2. From the standpoint of bookkeeping, such a condition may be considered quite satisfactory, but when the facts are known, possibilities of improvement at once present themselves. In the case of the firm referred to, less than 10% of the workers were earning all the company's profits; the other 90% were engaged in reducing these earnings. Why maintain such a situation? If no improvement can be made with respect to the prices received for the goods on which money is being lost, it would be cheaper to shut down these departments and pension the workers rather than to allow them to continue.

One reason why costs, rather than prices, are being used by executives is that costs can be found (in accordance with some specified formula) by conventional accounting systems and right prices cannot be so determined. Right prices are, in fact, beyond the scope of accounting. In order to establish them, it is necessary to make a careful engineering survey of the productive processes and an analysis of the work being performed by every member of the organization and every dollar invested in it.

The exact composition of an Economic Right Price will, of course, vary with circumstances, but Fig. 3 shows a structure that is typical for a wide variety of manufactured products.

It is made up of four main elements: (1) cost of materials; (2) service of processing cost; (3) "cost of progress" (a term which is to be preferred to "profit," which has no exact meaning), to which is added an amount to cover income tax; and (4) selling cost.

This list is, in itself, conventional enough, but many of the items composing it are treated in a manner that is quite contrary to conventional accounting practice. For example, the cost of purchased materials used in a product is not included in the "primary" cost of the product. All the other cost elements are found first, treating materials as though they cost nothing or were supplied by the customer. Then, to get the final price figure, the cost of materials (as of the day of shipment) is added. The fallacy of including the cost of purchased materials in all calculations on which estimates of selling cost, profit, and other "overhead" expenses are based has already been demonstrated by the experience of the ring manufacturer. To cite another case: a manufacturer making a rubber product based his prices (and therefore his overhead and profit estimates) on the cost of materials and labor going into this product. This was all very well when rubber cost 70 cents a pound—but he went into the receiver's hands when rubber went below 5 cents a pound.

In general, the almost universal custom of including purchased material costs in the "primary" cost of a product tends to make the price of low-quality goods too low and the price of high-quality goods too high. The "right" price for either class of goods can be found only by ignoring material costs until all other factors are determined, after which material costs are added.

In calculating the other elements that go to make up the "right" price, each element is determined—not from the figures shown in the books—but by studies which determine what it should be under normal conditions of operation. A detailed discussion would be required to describe the exact method by which each item is determined, but the result is a price which, when obtained for the normal output of a product, allows for proper wages, proper care and replacement of equipment, returns based on the current market price of money for all usefully invested capital, development and expansion at normal rates, reserves for contingencies and obsolescence, sufficient selling effort to sell the product at the "right" price, and other necessary details.

When such prices are determined for all of a company's products, the management is not only provided with a standard by which it can judge prices received, but is assisted in other ways. Significant inefficiencies in the productive processes are disclosed; the adequacy of the sales efforts being made can be determined; excessive or insufficient expenditures for any important purpose are detected; and the expectancy in regard to dividend payments is indicated.

349 Firms Join Chemical Alliance

The first list marked "A" indicates all the members of the Chemical Alliance who have assented to the Code of Fair Competition for the Chemical Manufacturing Industry as finally approved, with the exception of the companies starred. The "B" list gives the names of those firms who have assented to the Chemical Code as finally approved, but who have not yet joined the Alliance.

"A" List

Althouse Chemical Company, 540 Pear St., Reading, Pa.
Amalgamated Dyestuff & Chemical Works, Inc., Plum Point Lane, Newark, N. J.
*American Agricultural Chemical Co., 420 Lexington Ave., New York City.
American Aniline & Extract Co., Inc., Philadelphia, Pa.
American Chemical Products Co., 7 Litchfield St., Rochester, N. Y.
*American Commercial Alcohol Co., 405 Lexington Ave., New York City.
American Cream Tartar Co., % Stauffer Chemical Co., 112 West 9th St., Los Angeles, Calif.
American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York City.
American Cyanamid Company, 30 Rockefeller Plaza, New York City.
American Doucil Company, 112 So. 3rd St., Philadelphia, Pa.
*American Dry Ice Co., 205 East 42nd St., New York City.
American Dyewood Company, 100 East 42nd St., New York City.
American Glycerin Company, Wilmington, Delaware.
American Lanolin Corporation, Lawrence, Mass.
American Norit Company, Cleveland, Ohio.
American Platinum Works, The—N.J.R.R. Ave. at Oliver St., Newark, N. J.
American Potash & Chemical Corporation, 70 Pine St., New York City.
American Powder Co., 30 Rockefeller Plaza, New York City.
American Tar & Chemical Co. (of Duluth, Minn.), 424 Canada Cement Co. Bldg., Montreal, Canada.
American Tar Products Co. Inc., 1201 Koppers Bldg., Pittsburgh, Pa.
*Ames Chemical Works Inc., 21 Rogers St., Glens Falls, N. Y.
Anchor Color & Gum Works, % Arnold Hoffman & Co., Inc., 350 Madison Ave., New York City.
Ansbacher Siegel Corporation, 50 Union Square, New York City.
Ansul Chemical Company, Marinette, Wisconsin.
Apache Powder Company, Benson, Arizona.
Arizona Chemical Company, 30 Rockefeller Plaza, New York City.
Arkansas Chemical Company, Inc., 233 Broadway, New York City.
*Armour Ammonia Works, 1355 West 31st St., Chicago, Ill.
Armour Fertilizer Works, 816 Walton Bldg., Atlanta, Ga.
Arnold, Hoffman & Company, 350 Madison Ave., New York City.
Atlas Powder Company and subsidiaries, Wilmington, Delaware.
Austin Powder Company, 758 Rockefeller Bldg., Cleveland, Ohio.

Bakelite Corporation, 247 Park Ave., New York City.
J. T. Baker Chemical Co., Phillipsburg, N. J.
Baker & Co., Inc., Murray & Austin Sts., Newark, N. J.
Barium Products, Ltd., % United Chemicals, Inc., 405 Lexington Ave., New York City.
Barium Reduction Corporation, Charleston, West Virginia.
Barnes Chemical Works, Inc., Paterson, N. J.
Bates Chemical Company, Lansdowne, Pa.
*Baugh Chemical Company, 25 South Calvert St., Baltimore, Maryland.
Bay Chemical Company, 1007 Camp Street, New Orleans, La.
Belle Alkali Company, Belle, West Virginia.
*Benzol Products, Newark, N. J.
Blockson Chemical Company, Joliet, Ill.
The R. H. Bogle Company, Oronoco & See Streets, Alexandria, Va.
Bopf-Whittam Corporation, Westfield, N. J.
Borax Union, Inc., % Stauffer Chem. Co., 624 California St., San Francisco, Cal.
Henry Bower Chemical Mfg. Company, Philadelphia, Pa.
Brush Beryllium Company, 3715 Euclid Ave., Cleveland, Ohio.
Brush Development Company, 3715 Euclid Ave., Cleveland, Ohio.
Brush Laboratories Co., 3715 Euclid Ave., Cleveland, Ohio.
Buckeye Cotton Oil Company, Pulp Department, Memphis, Tenn.
Buckeye Soda Company, Painesville, Ohio.
Buffalo Electro Chemical Company, Station B., Buffalo, N. Y.
The Burnley Battery & Manufacturing Co., North East, Tenn.
The Burton Explosives, Inc., 926 Guardian Bldg., Cleveland, Ohio.

Calco Chemical Company, Bound Brook, N. J.
California Cap Company, Oakland, California.
California Carbonic Company, Los Angeles, Calif.
California Chemical Corp., % United Chemicals Corp., 405 Lexington Ave., New York City.
California Spray-Chemical Corporation, Berkeley, Calif. (Mr. Paul C. Skinner)
Carbide & Carbon Chemicals Corp., 30 East 42nd St., New York City.
Carbonic Manufacturing Corp., 144 East 44th St., New York City.
Carter Bell Mfg. Company, 150 Nassau St., New York City.
Catalazuli Mfg. Company, Inc., 119-01 22nd Ave., College Point, N. Y.
Catalin Corporation of America, 230 Park Ave., New York City.
Celluloid Corporation, 290 Ferry St., Newark, N. J.
*Central Chemical Company, 4100 S. Marshfield Ave., Chicago, Ill.
Chemical Manufacturing Co., Inc., Ashland, Mass.
Chemical Reduction Co., % United Chemicals Corp., 405 Lexington Ave., New York City.
Chipman Chemical Company, Inc., Bound Brook, N. J.
Church & Dwight Co., Inc., 70 Pine St., New York City.
Citro Chemical Company of America, Maywood, N. J.
Coast Manufacturing & Supply Co., Livermore, Calif.
Coleman & Bell, Norwood, Ohio.
Columbia Alkali Co., Barberton, Ohio.
Commercial Solvents Corporation, 230 Park Ave., New York City.
Commonwealth Color & Chemical Co., Brooklyn, N. Y.
Consolidated Chemical Industries Inc., San Francisco, Calif.
Consolidated Color & Chemical Co., 230 Fifth Ave., New York City.
Coopers Creek Chemical Company, West Conshohocken, Pa.
Copper Pyrites Corp., % Ducktown Chemical & Iron Co., 522 Fifth Ave., New York City.
Croton Chemical Corp., 57 Commerce St., Brooklyn, N. Y.
Crowley Tar Products Company, 415 Lexington Ave., New York City.
*Crystonyx Manufacturing Co. Inc., 1 Main St., Brooklyn, N. Y.
Curtin-Howe Corp. of Del., % United Chemicals Corp., 405 Lexington Ave., New York City.
Curtin-Howe Corp. Ltd., % United Chemicals Corp., 405 Lexington Ave., New York City.
Curtin-Howe Corp. of New York, % United Chemicals Corp., 405 Lexington Ave., N. Y. C.

*Darvin & Nord, Inc., Newark, N. J.
*Henry K. Davies & Co., Inc., 629 West 27th St., New York City.
Davies Nitrate Company, Inc., 57 Commerce St., Brooklyn, N. Y.
*The Davison Chemical Company, 1800 Baltimore Trust Bldg., Balto., Md.
Dearborn Chemical Company, 310 South Michigan Ave., Chicago, Ill.
Deepwater Chemical Company, Ltd., P. O. Box 762, Compton, Calif.
*Dehls & Stein, 237 South St., Newark, N. J.
J. A. Denn Powder Company, Portland, Oregon.
The Martin Dennis Company, 859 Summer Ave., Newark, N. J.
Detroit Chemical Works, 100 Junction Ave., Detroit, Mich.
Detroit Soda Products Co., 35 George St., Wyandotte, Mich.
Dewey & Almy Chemical Co., 235 Harvey St., North Cambridge, Mass.
Diamond Alkali Company, 436 Seventh Ave., Pittsburgh, Pa.
Dominguez Chemical Co., % Stauffer Chemical Co., 112 West 9th St., Los Angeles, Calif.
Dow Chemical Company, Midland, Mich.
*Dowell Incorporated, % The Dow Chemical Co., Midland, Mich.
*P. F. Drakenfeld & Company, Inc., 47 Park Place, New York City.
Ducktown Chemical & Iron Company, 522 Fifth Ave., New York City.
Ducktown-Pyrites Corp., % Ducktown Chemical & Iron Co., 522 Fifth Ave., New York City.
E. I. duPont de Nemours & Company, Wilmington, Delaware.
DuPont Viscoloid Company, 350 Fifth Ave., New York City.
Durite Plastics, Frankford Station, Phila., Pa. (Division Stokes & Smith).

*Egyptian Powder Company, East Alton, Ill.
Electric Smelting & Aluminum Company, 7016 Euclid Ave., Cleveland, Ohio.
Electro Bleaching Gas Co., % Niagara Alkali Co., 9 East 41st St., N. Y. City.
The Ensign Bickford Company, Simsbury, Conn.
*The Equitable Powder Manufacturing Co., East Alton, Ill.
*Ethyl-Dow Chemical Co., % The Dow Chemical Co., Midland, Mich.

The Fiberloid Company, Indian Orchard, Mass.
Fields Point Manufacturing Corp., Providence, R. I.
J. B. Ford Company, Wyandotte, Mich.
*Franco-American Chemical Works, Carlstadt, N. J.
Franks Chemical Products Co., 55-33rd St., Brooklyn, N. Y.
George G. Fries & Company, Inc., New York City.

*Garden State Chemical Company, 37 Bleeker St., Paterson, N. J.
Garrett-Callahan Company, 59 East Van Buren St., Chicago, Ill.
General Atlas Carbon Company, 60 Wall St., New York City.
*General Dyestuff Corporation, 230 Fifth Ave., New York City.
General Explosives Corporation, 30 Rockefeller Plaza, New York City.
General Plastics Inc., North Tonawanda, N. Y.
General Salt Company, Ltd., Los Angeles, Calif.
Giant Powder Company, Wilmington, Delaware.
Givaudan Delawanna Inc., 80 Fifth Ave., New York City.
*Glyco Products Company, Inc., 33-35th St., Brooklyn, N. Y.
*James Good, Inc., 2111 East Susquehanna Ave., Philadelphia, Pa.
Grasselli Chemical Company, 629 Euclid Ave., Cleveland, Ohio.
Great Western Electrochemical Co., 9 Main St., San Francisco, Calif.

Halowax Corporation, 247 Park Ave., New York City.
*Hanovia Chemical & Manufacturing Co., Chestnut St., and N.J.R.R. Ave., Newark, N. J.
A. Harrison & Company, Inc., Pawtucket, R. I.
The Harshaw Chemical Co., 1945 East 97th St., Cleveland, Ohio.
Hartman-Leddon Co., Inc., 6003 Girard Ave., Philadelphia, Pa.
Hercules Powder Company, Wilmington Delaware.
Herrick-Voigt Chemical Corporation, Bayonne, N. J.
Heyden Chemical Corporation, 50 Union Square, New York City.
Hoffman La Roche Inc., Nutley, N. J.
Hooker Electrochemical Co., 60 East 42nd St., New York City.
Hoover Color Corporation, 1133 Broadway, New York City.
E. F. Houghton & Company, 240 West Somerset St., Philadelphia, Pa.
Philip A. Hunt Company, 253 Russell St., Brooklyn, N. Y.
Hydrox Chemical Co. of Illinois, 225 West Huron St., Chicago, Ill.

Illinois Powder Manufacturing Co., 1752 Pierce Bldg., St. Louis, Mo.
*Illinois Western Cartridge Co., East Alton, Ill.
Independent Coal Tar Company, 88 Broad St., Boston, Mass.
Industrial Chemical Corp. Ltd., % United Chemicals Inc., 405 Lexington Ave., New York City.
Industrial Dyestuff Co., Massasoit Ave., East Providence, R. I.
*The Insel Company, Arlington, N. J.
*International Agricultural Corporation, 61 Broadway, New York City.
Interstate Chemical Manufacturing Co., Carbon Place & West Side Ave., Jersey City, N. J.
Irvington Smelting & Refining Works, 374 Nye Ave., Irvington, N. J.
Isco Chemical Company, Inc., Niagara Falls, N. Y.

Joanite Corporation, Long Island City, N. Y.
Jones Chemical Company, Midland, Michigan.

Kavalco Products Company, Inc., Nitro, West Virginia.
Kessler Chemical Corporation, 405 Lexington Ave., New York City.
Kinetic Chemicals Inc., Wilmington, Delaware.
The King Powder Company, Cincinnati, Ohio.
Koppers Products Company, Providence, R. I. (sub. of American Tar Products Co., Inc.)
Krebs Pigment & Color Corporation, 256 Vanderpool St., Newark, N. J.

Lacquer Chemicals, Inc., % Stauffer Chemical Co., San Francisco, Calif.
Latimer Goodwin Chemical Co., Grand Junction, Colorado.

Charles Lennig & Co., Inc., 222 West Washington St., Philadelphia, Pa.
John D. Lewis Inc., Providence, R. I.
*Liberty Powder Co., East Alton, Illinois.
Lindsay Light Company, 161 E. Grand Ave., Chicago, Ill.
The Liquid Carbonic Corporation, 3100 So. Kedzie Ave., Chicago, Ill.
Lockport Chemical Co., 414 Frick Bldg., Pittsburgh, Pa. (Sub. Standard Silicate Co.)
Louisiana Chemical Co. Inc., 1100 Financial Center Bldg., San Francisco, Calif. (sub. Consolidated Chemical Industries, Inc.)
John Lucas & Company, Inc., 322 Race St., Philadelphia, Pa.
Lucas Kiltone Co., 322 Race St., Philadelphia, Pa.
*Lucidol Corporation, 293 Larkin St., Buffalo, N. Y.

A. R. Maas Chemical Company, Los Angeles, Calif.
Mallinckrodt Chemical Works, St. Louis, Mo.
The Marblette Corporation (Svend Hansen), Long Island City, N. Y.
Marine Chemicals Co., Ltd., South San Francisco, Calif.
Maryland Chemical Co., Bayard & Russell Sts., Baltimore, Md.
The Mathieson Alkali Works Inc., 250 Park Ave., New York City.
Otto B. May, Inc., 198 Niagara St., Newark, N. J.
Maywood Chemical Works, Maywood, N. J.
*The McGean Chemical Co., 1030 Keith Bldg., Cleveland, Ohio.
Mechling Bros. Chemical Co., Camden, N. J.
Merck & Co., Inc., 161 Sixth Ave., New York City.
Merrimac Chemical Co. . Inc., Everett Station, Boston, Mass.
Metal & Thermit Corp., 120 Broadway, New York City.
Metasap Chemical Co., 15 Essex St., Harrison, N. J. (sub. of National Oil Products Co.)
J. Meyer & Sons, 480 Bourse Bldg., Philadelphia, Pa.
Michigan Alkali Company, 1622 Ford Bldg., Detroit, Mich.
Midland Ammonia Co., Midland, Mich. (sub. Dow Chemical Co.)
Milford Extract Co., Milford, Va.
Monarch Chemical Co., % United Chemicals, Inc., 405 Lexington Ave., New York City.
Monsanto Chemical Co., St. Louis, Mo.
Mutual Chemical Co. of America, 270 Madison Ave., New York City.

National Aluminate Corporation, 6216 W. 66 Place, Chicago, Ill.
National Ammonia Company, Inc., Frankford P. O., Philadelphia, Pa.
The National Fuse & Powder Co., Denver, Colorado.
National Kellastone Co., % United Chemicals Inc., 405 Lexington Ave., New York City.
National Oil Products Co. Inc., Harrison, N. J.
National Pigments Co., 1 Sidney St., St. Louis, Mo. (sub. National Pigments & Chem. Co.)
National Pigments & Chemical Co., St. Louis, Mo.
National Silicate & Chemical Co., 414 Frick Bldg., Pittsburgh, Pa. (sub. Standard Silicate Co.)
National Sulphur Co., % Stauffer Chemical Co., 420 Lexington Ave., New York City.
Natural Products Refining Co., 902 Garfield Ave., Jersey City, N. J.
The Naugatuck Chemical Co., 1790 Broadway, N. Y. C.
New York Quinine & Chemical Works, Inc., 99 North 11 St., Brooklyn, N. Y.
Niacet Chemicals Corp., Pine Ave. & 47th St., Niagara Falls, N. Y.
Niagara Alkali Co., 9 East 41st St., New York City.
Niagara Smelting Co., % Stauffer Chemical Co., 420 Lexington Ave., New York City.
Niagara Sprayer & Chemical Co., Inc., Middleport, N. Y.
Nicotine Production Corp., Clarksville, Tenn.
Nixon Nitration Works, Nixon, N. J.
The Northwestern Chemical Co., Wauwatosa, Wisconsin.
Novocol Chemical Manufacturing Co., Inc., Brooklyn, N. Y.

*Oakite Products Inc., 22 Thames St., New York City.
*The Oakland Chemical Co., 59 Fourth Ave., New York City.
Oldbury Electro-Chemical Co., Niagara Falls, N. Y.
Otto Torpedo Company, Duke Center, Pa.
Owl Fumigating Co., Azusa, Calif.
Ozark Chemical Co., Tulsa, Okla.

Pacific Bone Coal & Fertilizing Co., 1100 Financial Center Bldg., San Francisco, Calif. (sub. Consolidated Chemical Indus. Inc.)
Pacific Coast Borax Company, 51 Madison Ave., New York City.
Pacific R. & H. Chemicals Corp., El Monte, Calif.
Pacific Silicate Co., Matson Bldg., San Francisco, Calif. (sub. Phila. Quartz Co. of Philadelphia.)
Paper Makers Chemical Corp., Kalamazoo, Mich. (sub. of Hercules Powder Co.)
*Parker Rust-Proof Co., 2177 East Milwaukee Ave., Detroit, Mich.
M. W. Parsons, Imports & Plymouth Organic Laboratories, Inc., 55 Ann St., New York City.
Patent Chemicals, Inc., 57 Wilkinson Ave., Jersey City, N. J.
Pen-Chlor. Inc., Widener Bldg., Philadelphia, Pa. (sub. of Penn. Salt Mfg. Co.)
Pennsylvania Coal Products Company, Box 107, Petrolia, Pa.
Pennsylvania Salt Manufacturing Company, Widener Bldg., Philadelphia, Pa.
Peroxide Chemical Company, 6300 Etzel Avenue, St. Louis, Missouri.
Peroxide Mfg. & Specialty Co., % United Chemicals, Inc., 405 Lexington Ave., New York City.
Charles Pfizer & Co., Inc., 81 Maiden Lane, New York City.
Philadelphia Quartz Co., 121 South Third St., Philadelphia, Pa.
Philadelphia Quartz Co. of California, Ltd., Sixth & Grayson Sts., Berkeley Calif.
Phillips & Jacobs, 622 Race St., Philadelphia, Pa.
Phosphate Products Corp., Richmond, Va.
*Potash Company of America, 920 First National Bank Bldg., Denver, Col.
H. B. Prior Co., Inc., 420 Lexington Ave., New York City.
The Producers Torpedo Co., Marietta, Ohio.
Providence Drysalters Company, 812 Hospital Trust Bldg., Providence, R. I.
Provident Chemical Works, % The Swann Corp., Birmingham, Alabama.
Pure Calcium Products Company, Painesville, Ohio.
Pure Carbonic Company of America, 60 East 42nd St., New York City.

Raffi & Swanson, Inc., 1012 Broadway, Chelsea, Mass.
Rathbun Company, Inc., El Paso, Texas.
Robert Rauh, Inc., 480 Frelinghuysen Ave., Newark, N. J.
*Reilly Tar & Chemical Corporation, 500 Fifth Avenue, New York City.
Reilly-Whiteman-Walton Company, Conshohocken, Pa.
The Resinous Products & Chemical Co., 222 West Washington Square, Philadelphia, Pa.
Resinox Corporation, 230 Park Avenue, New York City.
*Rhodes Alkali & Chemical Corp., 521 Balboa Bldg., San Francisco, Cal.
Riverside Chemical Co. Inc., 771-947 River Road, North Tonawanda, N. Y.
Rohm & Haas Co., 222 West Washington Square, Philadelphia, Pa.
Rossville Commercial Alcohol Co., 230 Park Avenue, New York City (sub. of Commercial Solvents Corp.)
Royal Baking Powder Company, 595 Madison Ave., New York City.
Royce Chemical Co., Herrick St., Carlton Hill, N. J.
Rubber Service Laboratories Co., % Monsanto Chemical Co., St. Louis, Mo.
*Rumford Chemical Works, Rumford, East Providence, R. I.

*Salem Oil & Grease Co., 60 Grove St., Salem, Mass.
Geo. H. Salzgeber, 109 St. George St., St. Louis, Missouri.
San Francisco Sulphur Co., % Stauffer Chemical Co., 420 Lexington Ave. New York City
San Jose Spray Mfg. Co., % Stockton & Emery, San Jose, Calif. (sub. of Calif. Spray Chemical Company)
*Savell, Sayer & Co., Inc., North Transit Road, Lockport, N. Y.
J. Schnarr & Co., 120 West Pennsylvania Ave., Orlando, Florida.
Schuykill Chemical Co., 2346 Sedgley Ave., Philadelphia, Pa.
Sebs Chemical Co., 41 East 42nd St., New York City.
The Selden Company, 30 Rockefeller Plaza, New York City.
Seldner & Enequist, Inc., Brooklyn, N. Y. (86-112 Hausman St.)
The Sharples Solvents Corp., 23rd & Westmoreland Sts., Philadelphia, Pa.
Shell Development Co., 100 Bush St., San Francisco, Calif.
The Shepherd Chemical Co., Highland Ave., Norwood, Cincinnati, Ohio.
The Sherwin-Williams Co., 101 Prospect Ave., N. W., Cleveland, Ohio.
Sierra Magnesite Co. Ltd., % United Chemicals, Inc., 405 Lexington Ave., New York City.
Harold L. Simons, Inc., 11-25 44th Road, Long Island City, N. Y.
*Smooth-on-Mfg. Co., 568-574 Communipaw Ave., Jersey City, N. J.
*Soluol Corporation, 123 Georgia Avenue, Providence, R. I.
Southern Chemical Cotton Co., 45th St. & Central Ave., Chattanooga, Tenn.
Southern Mineral Products Corp., 120 Broadway, New York City.
The Sparkling Carbonic Co., Losantiville Ave., Cincinnati, Ohio.
E. R. Squibb & Sons, 25 Columbia Heights, Brooklyn, N. Y.
The Stamford Rubber Supply Co., off Shippan Ave., Stamford, Conn.
Standard Chromate Co. Inc., 414 Frick Bldg., Pittsburgh, Pa.
Standard Silicate Company, 414 Frick Bldg., Pittsburgh, Pa.
Standard Ultramarine Co., Huntington, West Virginia.
Stauffer Chemical Co., 112 West 9th St., Los Angeles, Calif.
Stauffer Chemical Co. of Indiana, % Stauffer Chemical Co., 420 Lexington Ave., N. Y. C.
Stauffer Chemical Co. of Texas, % Stauffer Chemical Co., 420 Lexington Ave., N. Y. C.
Stauffer Chemical Co. of Virginia, % Stauffer Chemical Co., 420 Lexington Ave., N. Y. C.
Sterling Borax Co., 526 W. 18th St., Chicago, Illinois.
Sterling Products Co., Easton, Pa.
Charles H. Stone, Chemical Works, 822 West Morehead St., Charlotte, N. C.
The Sureshot Torpedo Co., Inc., Huntington, W. Va.
Swann Chemical Co., Birmingham, Alabama.
The Swann Corporation, Birmingham, Alabama.
Synthetic Plastics Co. Inc., 30 Rockefeller Plaza, New York City.

Tacoma Electrochemical Co., Widener Bldg., Philadelphia, Pa. (sub. of Penn. Salt Mfg. Co.)
Tak, Inc., 859 Summer Ave., Newark, N. J. (sub. of Martin Dennis Co.)
*The Tanglefoot Co., Grand Rapids, Mich.
Taylor Chemical Corp. of Del., Widener Bldg., Philadelphia, Pa. (sub. of Penn. Salt Mfg. Co.)
Taylor White Extracting Co., Camden, N. J.
Tennessee Copper Co., 61 Broadway, New York City.
*Tennessee Eastman Corp., Kingsport, Tenn.
Texas Chemical Co., 1100 Financial Center Bldg., San Francisco, Calif. (sub. of Consolidated Chemical Industries, Inc.)
Textile Products Co., Providence, R. I.
*Titanium Pigment Co. Inc., 111 Broadway, New York City.
Tobacco By-Products & Chemical Corp., Louisville, Ky. (1010 Columbia Bldg.)
Toledo Synthetic Products Co., Inc., Toledo, Ohio.
The Tromite Corp., % Westvaco Chlorine Products Corp., 405 Lexington Ave., New York City.
Tropic Chemical Works, Panasoffkee, Fla.
*The Trubek Laboratories, Inc., State Highway No. 2, East Rutherford, N. J.

United Chemicals Inc., 405 Lexington Ave., New York City.
United States Industrial Alcohol Co., 60 East 42nd St., New York City.
United StatesIndustrial Chemical Co., Inc., 60 East 42nd St., New York City.
United States Potash Co., Inc., 342 Madison Ave., New York City.
Unyte Corporation, 521 Fifth Ave., New York City.

Van Ameringen-Haebler, Inc., 315 Fourth Ave., New York City.
Van Dyk & Company, Inc., 57 Wilkinson Ave., Jersey City, N. J.
Veritol Corp., 859 Summer Ave., Newark, N. J. (sub. of Martin Dennis Co.)
Verona Chemical Co., 26 Verona Ave., Newark, N. J.
Victor Chemical Works, 141 W. Jackson Blvd., Chicago, Illinois.
Virginia Cellulose Department, Hercules Powder Co., Wilmington, Delaware.
Virginia Fertilizer Corp., % Monsanto Chemical Co., St. Louis, Mo.
Virginia Smelting Co., 131 State St., Boston, Mass.
*The Vitro Manufacturing Co., 50 Oliffe St., Corliss Station, Pittsburgh, Pa.
Vulcan Detinning Co., Sewaren, N. J.

*The W-B Chemical Co., 500 Fifth Ave., New York City.
The Warner Chemical Co., 405 Lexington Ave., N. Y. C.
Warwick Chemical Co., West Warwick, R. I.
*Washington Liquid Gas Co., Inc., Seattle, Wash.
West Disinfecting Co., 42-16 Barn St., Long Island City, N. Y.
*Western Powder Manufacturing Co., East Alton, Ill.
Westvaco Chlorine Products Corp., 405 Lexington Ave., New York City.
Wheeler, Reynolds & Stauffer Co., % Stauffer Chemical Co., 420 Lexington Ave., N. Y. C.
The White Tar Co. of New Jersey, Koppers Bldg., Pittsburgh, Pa. (sub. American Tar Products Company, Inc.)
Wilckes, Martin, Wilckes Co., % The Swann Corp., Birmingham, Alabama.
Jacques Wolf & Co., Passaic, N. J.
The Wolff Alport Chemical Corp., 1127 Irving Ave., Brooklyn, N. Y.
The Wood Ridge Manufacturing Co., 405 Lexington Ave., New York City.

J. S. Young & Co., Hanover, Pa.
J. S. Young Co., 2701 Boston St., Baltimore, Md.

Zero Ice Corporation, Linwood & Penn R. R., Detroit, Mich.

"B" List

American Fluoride Corporation, 151 West 19th St., New York City.
C. G. Buchanan Chemical Co., Baker Avenue, Norwood, Cincinnati, Ohio.
Buco Products Co., Cincinnati, Ohio.
California Soda Company, 355 Cypress Street, Oakland, Calif.
John Campbell & Co., 75 Hudson St., New York City.
W. C. Durfee Company, Inc., 516 Atlantic Avenue, Boston, Mass.
The Edwal Laboratories Co., 3420 Indiana Avenue, Chicago, Ill.
Felton Chemical Company, Inc., 599 Johnson Avenue, Brooklyn, N. Y.
Foote Mineral Company, Inc., 1609 Summer St., Philadelphia, Penn.
Grange Powder Co., Seattle, Washington.
Peerless Color Co., Plainfield, New Jersey.
St. Louis Sulphur & Chemical Co., 300 East Primm St., St. Louis, Mo.
Seydel & Co., 135 Holladay Street, Jersey City, N. J.
Van Schaak Bros. Chemical Works, Avondale Avenue, Chicago, Ill.
Young Aniline Works, Inc., Baltimore, Maryland.

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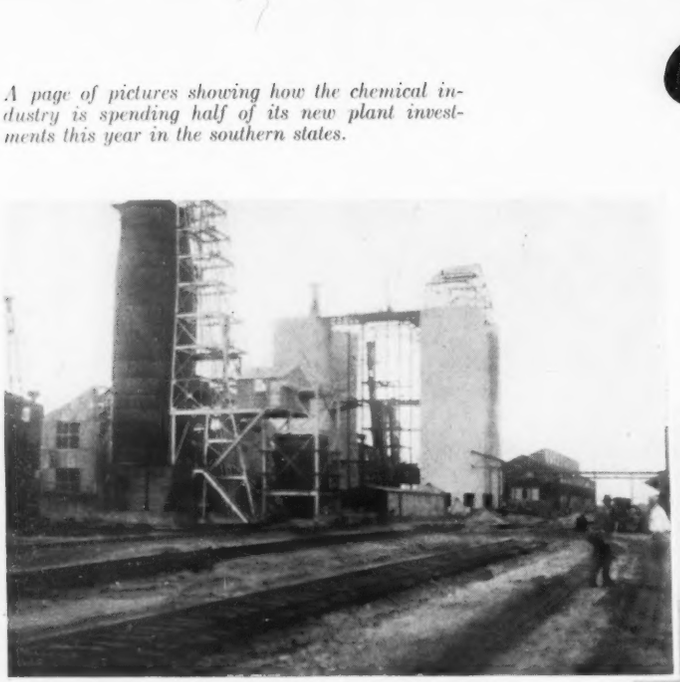
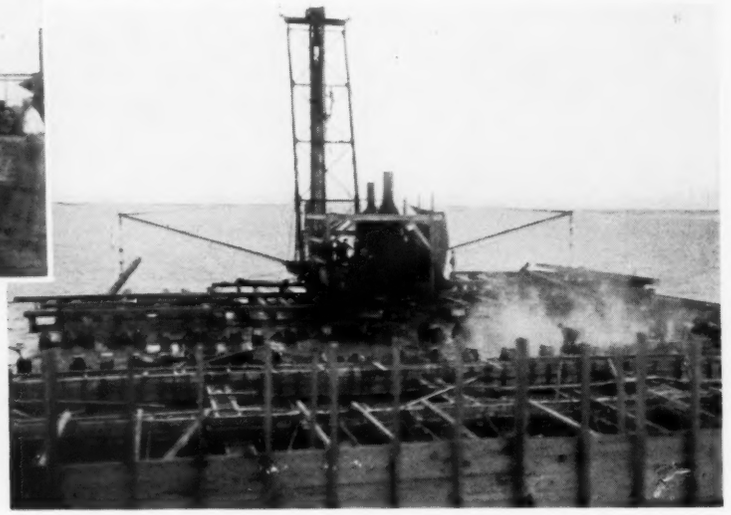
CHEMICAL

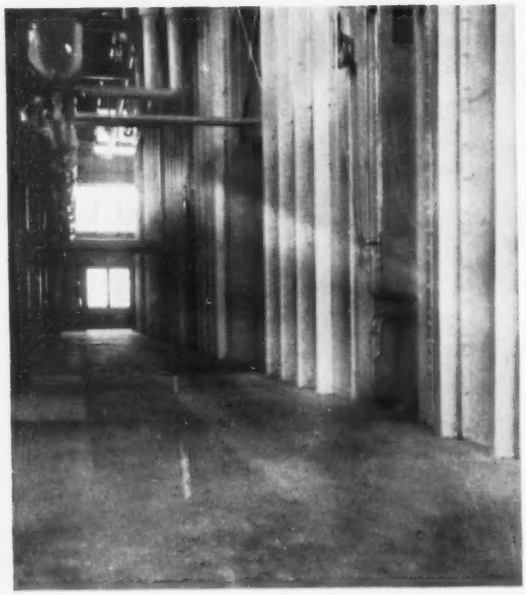
The Photographic Record

A page of pictures showing how the chemical industry is spending half of its new plant investments this year in the southern states.



By early Fall this new plant of the Southern Alkali Corporation, at Corpus Christi, Texas, will begin operations. Below is the new dock on Corpus Christi harbor, from which shipments will be made.





Not a Gothic cathedral—the boiler room of the Freeport Sulphur Company's new plant at Grande Ecaille, La.

Above, the refinery of the U. S. Potash Company, at Carlsbad, New Mexico, the size of which is being trebled this season. To the left, Stone and Webster are building the new phosphate and fertilizer mixing plant shown in the foreground in front of the old kiln building at the Muscle Shoals Nitrate Plant Number 2.

NEWS REEL

of Our Chemical Activities

The "Two Bills" and their mascot, "The Concrete Eagle," challenge the world for any kind of a golf match. William W. Buffum (Chemical Foundation) and Dr. William J. Hale (Dow Chemical).

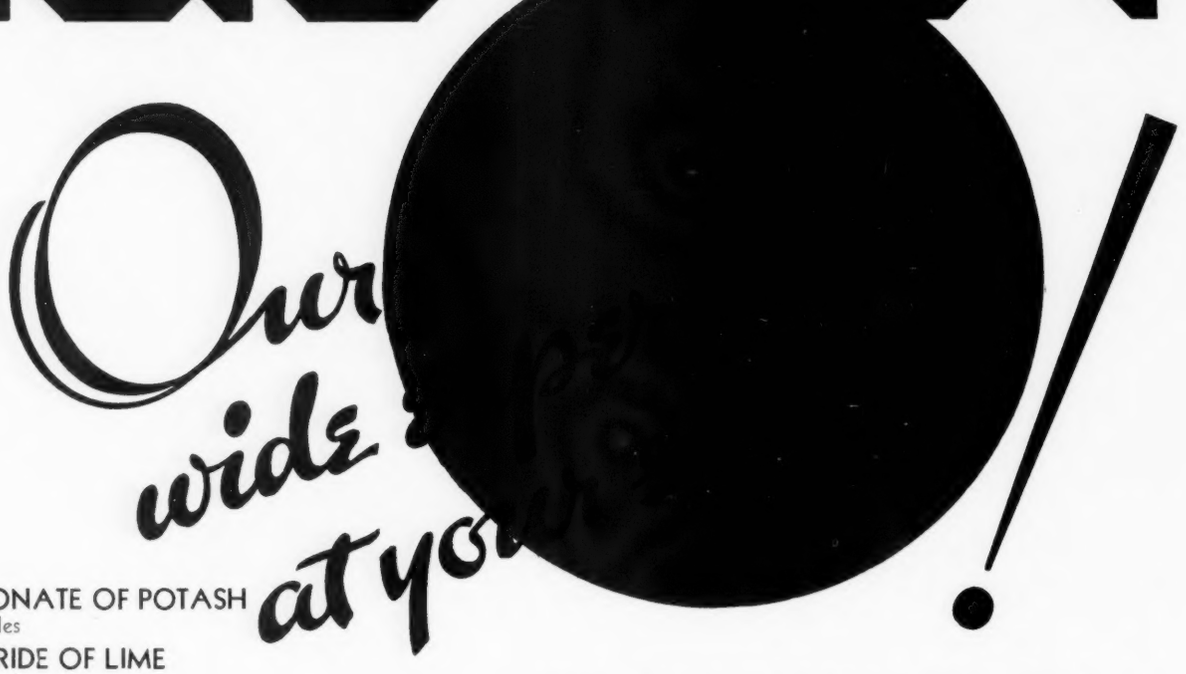
Right, a field office afloat. The assistant superintendent, Harvey Wilson, of the Jefferson Lake Sulphur operation, in the middle of Jefferson Lake, La.

Two of the executive offices of the new American Cynamid & Chemical Corporation's headquarters in Rockefeller Center, which are described in greater detail, with other photographs, in the news section of this issue.

Arthur Miller, formerly with General Chemical and Tennessee Eastman, now manager of U. S. Nitrate Plant No. 2, at Muscle Shoals.

ISCO

"OVER A CENTURY OF SERVICE AND PROGRESS"



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  Various Forms
- **CAUSTIC SODA**
  Flake—Solid—Crystal
- **LARVACIDE** (Chlorpicrin)
  The Ideal Fumigant
- **ZINC OXIDE**
  Vielle Montagne
- **SILICA**
  Soft Decomposed
- **WAXES**
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Chemical Consumption

A digest of new products and processes in process industries for the user of chemicals.

White Enamels from Alkyd Resins

There are wide demands in the United States for non-yellowing white enamels for industrial and other applications, which are being met today quite largely by the use of alkyd resins, several types of which are employed for this class of work. In industrial work finishes of this type are usually sprayed on, and may be dried in a baking oven or, if rapid drying is not required, may be air dried over night. Some enamels of this type, designed for use on inexpensive metal articles in which the cost of finishing must be minimized, give excellent covering in a single coat, but, of course, two or more coats are recommended when high-grade work is required.

Alkyd resins are light in color and, being opaque to light of short wave length, are not subject to the discoloration which is characteristic of most phenolic resins. They are available in solutions which form the entire vehicle, so that all the paint manufacturer need do in formulating an enamel is to add a suitable pigment and a proper proportion of metallic dryer to give the drying qualities desired. If he selects a non-yellowing pigment, the finish will remain white almost indefinitely. Enamels in which alkyd resin vehicles are employed withstand higher than usual baking temperatures without serious color change.

Enamels employed in finishing electric and other refrigerators are now quite generally formulated with alkyd-resin vehicles. Such enamels are required to meet very difficult service conditions, for, besides resisting discoloration, they must stand up under high humidity, be highly flexible, possess excellent adherence, be very resistant to water and to grease and withstand frequent washing, and, of course, must not be easily chipped. Some of the alkyd resins employed for making enamels of this type are excellent for undercoats as well as for finishing coats.

One of the oxidizing types of alkyd-resin solutions widely and successfully used in formulating finishes of the type in question, has the following properties:—

Non-volatile, 64 to 66 per cent.
Solvent, coal-tar solvent naphtha.
Gardner Holt tube viscosity, Y—Z_1.
Viscosity in centipoises, 2,000—3,000.
Color (Paint and Varnish Institute Glass Standards), 4—5.
Acid number (solution), 5—8.
Specific gravity, 0.995.
Weight, lb. per U. S. gallon at 21° C., 8.3.

In preparing light-colored baking enamels with this alkyd-resin solution, the following formulae are typical of the practice recommended:

Primer

Mill base (pebble mill):	*% by weight*
Alkyd resin solution	9.5
"Hiflash" naphtha	8.0
Zinc sulfide	36.0
Zinc oxide	2.0
After grinding, add alkyd-resin solution	44.5
	100.0

Finish

Mill base (pebble mill):	
Alkyd resin solution	9.0
"Hiflash" naphtha	6.0
Pine oil	1.5
Titanium oxide	29.0
Zinc oxide	1.5
After grinding, add alkyd-resin solution	53.0
	100.0

Thinner

Solvent naphtha	75.0
Petroleum solvent	25.0
	100.0

Materials Used

Titanium oxide, low oil-absorption grade.
Zinc oxide, "White Seal" grade.
Pine oil, steam-distilled and water-white.
"Hiflash" naphtha, water-white and non-corrosive, having a boiling range of 150 to 200° C.
Solvent naphtha, coal-tar fraction of 130 to 180° C. boiling range.
Petroleum solvent, high-solvent-strength fraction of 125—170° C., or a good grade of petroleum spirits.

To produce a neutral white, a tinting paste, consisting of 10 parts ultramarine blue and one part bright red iron oxide is quite satisfactory.

For spray application, the primer is reduced four parts to one of thinner by weight; and the finish is reduced three parts to one of thinner. The most satisfactory baking schedule calls for baking one hour at 170° C. in the case of the primer, and for two

hours at 125° C. for the finish; but a schedule involving one half-hour baking of the primer at 185° C. and one hour baking of the finish at 140° C. is also suitable. If it is desired to lower the baking temperature, this may be done by adding small quantities of cobalt-zinc drier.

The recommended dry-film thickness for the primer is 1 to 1.2 mils., and for the finish coat 0.9 to 1.0 mil.; but if thicker films are desired two coats of the finishing enamel may be applied; the first being baked one hour at 160° C., and the second for two hours at 125° C.—*Synthetic and Applied Finishes.*

Ceramics

Barium Nitrate in Enamel Frits

Use recommended on the following grounds: It is less hygroscopic than the nitrates of soda or potash; less soluble than the latter and does not attack the walls of the fusion vessel. The decomposition of the barium nitrite, formed during the fusion, only takes place at very high temperatures, consequently more limpid enamels result. Is superior to barium carbonate in that its melting point is 593° C. against 795° C. of the carbonate; thus frits based on the nitrate are much easier to fuse. Also, the decolorizing action of barium nitrate is better than that of the alkaline nitrates or barium carbonate. The frits obtained powder easily, and the capillary cracking of the enamels and glazes is less marked.

Glass

Aluminum Phosphate as Glass Ingredient

In new glass products recently developed, the silica is replaced wholly or partially by phosphate of alumina. The glasses are very transparent to ultra-violet radiation.

New Art Process for Glass

Much success has been achieved by a new process of a mechanical and chemical character by which artistic designs of any kind can be reproduced on glass, from which discovery a highly important new industry may arise. The designs are reproduced on mirror glass and any subject can be portrayed down to the most minute detail. The main feature is the coloring. The designs are translucent and can be made very effective at night by placing lights behind the glass. The process not only ensures accuracy and delicacy of color but permanency of design.

Coloring Glass with Graphite

A graphite with 25 per cent. carbon content is a satisfactory yellow coloring agent for glass and yields no residue. As the carbon content increases, the utility of a graphite for this purpose diminishes. The 85-99 per cent. products are only usable in very small quantities, while graphites containing from 91-97 per cent. dissolve in glass only with great difficulty and do not color it. The coloring power of a graphite seems to be inversely proportional to its content in sulfur and iron. The results are particularly applicable to Bavarian graphite.

Flexible Glass

Flexible to a marked degree and withstanding great pressure, a new plate glass has been introduced that is unbreakable. On a sheet a yard or so long, raised on two supports, two men can stand; the only effect being that the glass curves slightly, resuming its normal straightness immediately upon removal of the weight. Its use has been sanctioned in ½ inch thickness for ship's portholes, instead of the normal thickness of one inch. Composite sheets of the glass have been subjected to shots from rifles and revolvers, and while in some cases the outer sheet may be dented, the mass remains intact.

Textiles

Month's New Dyes

Palatine Fast Red BEN, a new brand of the Palatine Fast Colors offered to the trade by General Dyestuff. Distinguished by very level dyeing properties, which make it a splendid shading color for combination shades. Possesses very good fastness to light and good fastness to washing, water and salt-water, as well as to rubbing, hot pressing, perspiration, alkali, and carbonizing. Recommended for dyeing woolen piece goods for men's wear and ladies' dress goods, for carpets, hosiery, and knitting-yarn. Its good solubility makes it very suitable for machine work in the dyeing of worsted yarn or slubbing for goods which have to stand only a moderate milling. May be discharged with Rongalite C to a clear white and is well suited for direct printing of wool and silk.

Also offered by the same company is Alizarine Direct Blue. Dyed from a Glauber's salt-sulfuric acid bath, it is said to produce bright blue shades of very good fastness to light. Said to dye very level and recommended in combination with Fast Light Yellow 2 G.X., concentrated, and Fast Light Red B.A. of Supra Light Rubine B. L. for the production of fancy shades of very good light fastness on ladies' dress goods. From a weak acetic acid bath, Sulphon Orange G.A. is said to produce on wool a bright orange of very good fastness to washing, water and salt water. Especially recommended for the dyeing of woolen material for the knitting trade. It draws very well from a neutral bath and is therefore recommended as a good union color. Also adapted for the dyeing of pure silk.

Waterproofing Solution

Gelatinous silica is mixed with a rubber latex solution and alkali silicate added. Metallic salts may be added to the solution, and the proper proportions of silica and latex should be between 33 and 66 per cent. The material may be waterproofed by steeping, impregnating, rolling, brushing, or spraying.

Control of Bleaching

A method which gives a direct indication of the chemical state of cellulose, and the average length of its fibre molecules is described in *Silk & Rayon*. This depends on the fact that when cellulose is dissolved in a suitable solvent such as cuprammonium hydroxide the chains are not broken up into their separate links, but merely separate so as to move in the solution independently. Under these conditions there is a relation between the viscosity of the solution and the average length of the chain molecules which it contains. The viscosity of a standard cellulose solution is therefore a convenient index of the average chain length which, in turn, determines any loss of strength due to chemical causes. In the work of the Cotton Research Association a simplified standard procedure has been developed for cotton and, by using a greater concentration of cellulose, has also been applied to the testing of rayon. The use of such a viscosity test affords the most satisfactory means of checking for possible overbleaching in practice.

New Yarn

Announcement is made of the production of a new, fine filament dull yarn, 60 filaments in 150 denier, available to the trade, the first of its type to be marketed commercially and a new development in the synthetic textile field.

Patents—Textiles

Wetting and dispersing agents. No. 1,951,469. H. Bertsch, to firm H. T. Bohme, A-G., Chemnitz, Germany.

Rayon coating, for softness and flexibility. No. 1,951,712. C. Schoeller, to I. G. F., Frankfort, Germany.

Emulsifying detergent and wetting agent. No. 1,952,008. H. A. Bruson, to Resinous Prod. & Chem. Co., Philadelphia.

Cellulose xanthate-carbon disulfide viscose solution. No. 1,952,604. H. H. Parker, to Du Pont Rayon Co., N. Y. City.

Sodium Fluoride in sulfur black dyed goods. No. 1,953,908. H. A. Lubs & H. W. Walker, to du Pont & Co., Del.

Discharge effects on cellulose textiles from ground colors by stannous and titanous compounds. No. 1,954,622. G. H. Ellis & W. B. Miller, to Celanese Corp., N. Y.

Metals and Alloys

Rust Preventive Oils

Oils said to provide a means of arresting rust on iron and steel, and also to prevent tarnishing of non-ferrous metals, are being marketed. The oils are made in a variety of consistencies, to meet various applications. There are grades for every type of protection, including one recommended by the maker for use on nickel and chromium plated work.

Nickel Solution for Zinc and Zinc Die Castings

Especially developed for plating zinc and zinc-base die castings without nickel striking, this solution is claimed to provide perfect nickel plate for polishing to a high lustre finish, or for undercoat on chromium work. Advantages include high throwing power for reaching all recesses; no burning of high spots or corners; low current density operation (7 to 12 amperes per sq. ft.); permanency with directed maintenance; no fouling by dissolved zinc; high anode efficiency; uniformly dense, adherent deposits of nickel.

High Gloss Nickel Process

A new process for the electro-deposition of nickel has been developed. Thick deposits of great brilliance and beauty can be obtained, even at high current densities, in a highly efficient and stable electrolyte which is entirely self-sustaining from the anode.

Protective Coatings

A material said to have superior anti-corrosion properties, and the advantage of being applicable over rusted or corroded surfaces, where it prevents further corrosion, is now on the market.

Leather

Dehairing Action of Amines

When primary methylamine is added to a suspension of lime it activates the production of sulfides from both hair and cystine. Dimethylamine inhibits the production of sulfide from cystine, but increases very markedly the rate of production of sulfides from hair, being in this way superior to the monomethylamine. Dr. R. H. Marriott, in discussing this subject before the International Society of Leather Trades' Chemists, pointed out that trimethylamine has no action at all on cystine or hair. In the presence of sodium hydroxide none of the amines lead to the production of sulfide from cystine, but the presence of monomethylamine and especially dimethylamine activate the production of sulfide from hair. Trimethylamine is without effect.

Treating Leather with Calcium Carbonate

An effective preventive of rotting and recommended for use in leathers to be used for bookbinding, upholstery, and other purposes for which a life of more than two or three years is desired. In the process, five to eight per cent. of calcium carbonate, together with 0.25 per cent. of calcium chloride, should be added to the final dyebath, after exhaustion, and the goods drummed until as complete an absorption as possible has been obtained. The reason for adding the chloride is to reduce still further the solubility of the carbonate.

Hydrolysis of Chromium Sulfate Solutions

This work, as described in *The Leather Trades' Review*, is based upon titration curves of various chrome solutions using mainly the quinhydrone electrode system which is indispensable owing to its rapidity in obtaining stable readings. Chromium sulfate solutions hydrolyze in water and this is increased by increasing temperature. The reaction in heated solutions especially is not reversible owing to olation changes taking place. Olation takes place, with chlorides, but not nearly to the same extent as with sulfates, organic acids and with bicarbonates. Aluminum salts do not undergo these olation changes as is clearly indicated by the titration curves of solutions prepared cold and at boiling temperature. Chrome alum, on the other hand, yields entirely different results with cold and boiled solutions. The changes undergone are explained by the Werner theory which has become much more easily comprehensible by the assistance of modern theories of valency based upon electron distribution. The changes brought about on making chrome liquors basic are clearly demonstrated by the pH measurements and afford explanations of the well-known phenomenon that chrome leather after neutralization becomes more acid. This is due to hydrolysis and olation in which two chromium atoms become associated in a six-membered ring structure with an OH group and the sulfur and two oxygen atoms of the sulfate radical. Similarly organic acids (and from the point of view of chrome tanning, the hide itself behaves as an organic acid by virtue of its carboxyl groups) and bicarbonates function in a similar manner to sulfates. The precipitation point control method and its practical application initiated by McCandlish are shown to be essentially correct from theoretical considerations and it is further clear that pH measurements lead to a similar result.

Colloidal Suspension

A resinous synthetic tanning material prepared in a colloidal suspension is of value for hastening vegetable tanning and for improvement of chrome-tanned leathers. A typical product is prepared by condensing naphthalene sulfonic acid with dibenzyl-naphthalene by means of formaldehyde.

Patents—Tanning

Tanning agent from hydroxy aromatic sulfonic acid, with thiourea. No, 1,951,564. I. C. Somerville & H. R. Raterink, to Rohm & Haas, Philadelphia Pa.

Lignosulfonic and lactic acid tanning preparations. Nos. 1,952,642-3. F. J. Wallace, to Robeson Process Co., N. Y.

Coatings

Preparation Cadmium Yellow

Light colored cadmium yellow having a greenish tinge is prepared from precipitated, and preferably dried; dark cadmium sulfide by mixing it with zinc sulfide, *e. g.* lithopone, and heating to 350-450° C.

Cadmium Pigments Manufactured

Treatment of soluble cadmium salts with hydrogen sulfide gives a precipitate suitable for the enamel industry, but unsuitable as a raw material for cadmium red production. Precipitation with soluble alkali sulfides gives a cadmium sulfide unsuitable for both purposes mentioned, but the cadmium yellow obtained by the decomposition of cadmium carbonate with alkali sulfides, or still better with ammonium sulfide, gives a cadmium yellow quite suitable for all purposes. Author also investigated dry production of cadmium sulfide by heating mixtures of cadmium carbonate and sulfur. Resultant sulfide was found on X-ray examination to be a mixture of the alpha and beta cadmium sulfide in varying proportions, and was quite satisfactory as a raw material for cadmium red and as a body color for enamels and glazes. Author also describes a new direct process for the preparation of cadmium red, this being the decomposition of cadmium carbonate with a solution of selenium in alkali sulfides or ammonium sulfide. Thio-selenides are first obtained. These, at high temperatures, lose part of their sulfur, and on final heating give the brilliant red pigment desired.

Author finally investigated possibility of a direct dry process for the production of cadmium red—namely, by heating mixtures of cadmium carbonate, sulfur, and selenium. It was found that at temperatures of about 300° C. mixtures of sulfide and selenide were obtained as a brown powder. On raising temperature to 450° C. exothermic reaction took place with a production of the red pigment, the temperature stability range of this red pigment being from 450° to about 650° C.—Dr. Ludwig Stuckert. *Farben Zeitung.*

Cadmium Sulfide Pigments

Pigment, obtained by reacting with a cadmium-salt solution with an aqueous solution of organic sulfur compounds such as thiocarbonic acid, thiocarbamates, etc., is claimed to be of great tinctorial power, and especially suitable for pigmenting cellulose lacquers applied by the spraying process. The reaction can be effected in either neutral or alkaline medium. At low temperatures the pigment produced is pale or greenish yellow; at high, the shade varies from reddish yellow to orange. If the precipitation is effected in a solution of viscose, a product of added value for lacquer purposes is obtained.

Patents—Coatings

Oil-soluble synthetic resins. No. 1,952,676. G. Kraenzlein & A. Voss, to I. G. F., Frankfort, Germany.

Resinous composition, of alcohols and fatty acids. No. 1,953,593. T. F. Bradley, to American Cyanamid Co., N. Y. City.

Patent leather coating of baked polyhydric alcohol-polybasic acid, acid resin. No. 1,954,750. H. H. Hopkins, to du Pont & Co., Del.

Thermoplastic cell. undercoating and acid resin top for high glaze fabric finish. No. 1,954,751. A. W. Bateman & R. E. Thomas, to du Pont & Co., Del.

Synthetic resin—condensed aldehyde with a dihydroxy-benzophenone. No. 1,954,826. W. H. Moss, to Celanese Corp., Del.

Coating; phenolic resin reaction product and cellulose ester/drying oil. No. 1,954,836. V. H. Turkington, to Bakelite Corp., N. Y.

Processes for 1/conc. solutions of lower aliphatic acids, and 2/ aliphatic ketones. Nos. 1,952,845-6. Henry Dreyfus, London.

Soap

Cold Soap Process

This so-called process used for soap manufacture has proved unsatisfactory for many reasons: *i. e.*, the incompleteness of saponification resulting in excess alkalinity or rancidity, depending on whether alkali or fat is in excess, and the difficulty of reproducing previous results. In a new method soaps are prepared under similar conditions, but resin mixtures which have been heated and then cooled are quickly introduced into the fat-alkali mixtures. Thus a well-stirred mixture is prepared of 170 lbs. of palm kernel oil and nine gallons of a 36 deg. Be. caustic soda solution; 6.5 gallons of another mixture are also made up containing equal proportions of the oil and resin. The oil and resin mixture is heated to 250° F., cooled to 110° F., then quickly introduced into the first mixture. After stirring for ten seconds the soap is run out through a valve in the bottom of the mixing pan and then treated in the usual manner.

Paper

Sulfite Bond Research

In recent studies of the mechanical treatment of sulfite wood fibers, the "beating" operation, conditions are outlined whereby bond paper of maximum strength was obtained without impairment of other desirable properties, such as stability and opacity. Very careful control of this operation is necessary for the best results. Study of the influence of the various sizing materials used to impart good writing quality and other desirable properties yielded some interesting results. As in the case of other types of fibrous raw materials, careful control of the amount of alum, was found necessary. Too much acidity from alum adversely affected the stability of the papers, as judged by the heat test, but when the minimum amount for satisfactory writing quality was used, the stability of the papers was not impaired.

Unlike papers made from stronger and purer fibers, the stability of these sulfite papers was not adversely affected by rosin, and was improved very little by surface sizing them with glue or starch. Starch incorporated in the paper stock increased the folding endurance somewhat, but the surface sizing treatment had little effect in this respect.

Patents—Cellulose

Mfr. and treatment of 1/cell. esters and 2/aliphatic anhydrides. Nos. 1, 952,843-4. Henry Dreyfus, London.

Refining cellulose. No. 1,953,191. Geo. A. Richter, to Brown Co., Berlin, N. H.

Hydrogen peroxide treatment of cellulose esters. No. 1,953,398. R. E. Eskew, to Du Pont Viscoloid Co., Wilmington, Del.

Process for plasticized cellulose derivatives. No. 1,953,956. H. Dreyfus, London.

Mfr. of aliphatic ketones. No. 1,954,023. Oxley, Groombridge & Thomas, to Celanese Corp., N. Y.

Improvement of cell. substitution derivatives. No. 1,954,729. C. Dreyfus & G. Schneider, to Celanese Corp., N. Y.

Non-opaque films from cellulose nitrate coating composition. No. 1,939,676. G. R. Ensminger to duPont & Co., Wilmington, Del.

Reduction of viscosity of cellulose nitrate. No. 1,946,067. R. E. Eskew, Rahway, to Dupont Viscoloid Co., Wilmington, Del.

Artificially crinkled cellulose material, 8-35% sodium hydroxide treatment, as fabric. No. 1,945,537. G. L. Schwartz, to duPont & Co., Wilmington, Del.

Cellulose derivative composition. No. 1,943,972. E. F. Izard, to duPont & Co., Wilmington, Del.

Esterification of cellulose by organic acid anhydrides, with complex catalyst. No. 1,943,507. H. L. Barthelemy, Milan, to Ruth Aldo Co., Inc., N. Y. City.

Nitro-mixed fatty acid esters of cellulose. No. 1,943,231. D. R. Wiggam & J. S. Tinsley, to Hercules Powder Co., Wilmington, Del.

Cellulose solution, by dissolving in modified liquid ammonium salt. No. 1,943,176. C. Graenacher to Soc. of Chem. Ind., Basel, Switzerland.

Oleaginous seed protein for paper coating. No. 1,955,375. C. N. Cone & E. D. Brown, to Glidden Co., Cleveland.

Miscellaneous

Uses of Tripoli

In an article on "The Industrial Uses of Natural Silica," in *The Chemical Age* mention was made that tripoli has many desirable properties for use as a general filler, the most important being color (if desired, pure white), relative inertness to chemical action and moderate heat, and comparative ease with which it can be finely pulverized. Due to its absorbent properties it is used to a considerable extent as a mechanical cleanser, in admixture with soap and other detergents. It is often employed interchangeably with pulverized silica for use as a filler or inert extender in paints and transparent wood fillers. As an extender in paint the material must be pure white and finely ground; for use strictly as an inert extender it should be noted that tripoli surpasses pulverized quartz, as it does not settle out of the paint mixture so readily. Certain quantities are also used as a filler in hard-rubber compounds, especially in making battery jars. It is also reported that it is used as a filler in the manufacture of gramophone records and as a carrier of insecticides for the "dusting" of plants and trees.

Diatomaceous Earth

In the foregoing article it states that the chief value of diatomite depends upon its physical structure. The hollow cells of the diatoms provide a mass of dead air spaces, which are the cause of the low apparent density of the material (0.24 when dry and 0.34 when calcined) and the reason for its value as a heat and sound insulating medium. The exceedingly small size of these cells also makes diatomite useful as a filtering medium, and as an absorbent; good material absorbs four to five times its weight of water. Diatomite can also be classed as a mild abrasive. The original particles are not only rather fine, but owing to their fragile structure they break down easily under pressure. Because of this the material is well adapted for fine metal polishes, buffing compounds, and tooth paste, where a mild but hard abrasive is needed. Considerable quantities of diatomite have been used as an addition to concrete, its purpose being to absorb excess water which is slowly released as the concrete sets and to act in the role of a lubricant. As a lubricant it finds considerable use at central mixing plants, as it allows less water to be used and keeps the concrete in a soft, easy-flowing condition for use. It has already found application as a packing material around glass containers when the contained reagents might cause spontaneous combustion in contact with organic material; as an ingredient in various cements, blackboard crayons, porous chemical ware, dusting powders, and foundry partings; and has also been suggested for use as a filler or packing for gas-absorption towers. Materials of the proper physical strength and porosity may be used as a

medium through which air is blown into a solution, and the fine size of the resulting bubbles causes intense aeration or oxidation.

Anti-Foaming Agents

An objectionable feature in adhesive solutions is the formation of foam. Suggested preventives are: Crude glycerine: used largely in the paper industry. Its effect depends on the content of free fatty acids, as pure glycerine has no action; it has no effect on solutions of animal size. Amyl alcohol: Often used when milk is unsuitable. Calcium or barium ricinoleate: A solution of either of these in castor oil is also helpful. Fish glue: very suitable for prevention of foam in dextrin cold glues; improves the quality of the dextrin. Turpentine and olive oil are used in calico printing. Methyl and ethyl alcohols are not as good as butyl. Benzine does not prevent foam, but causes its rapid disappearance. Carbon tetrachloride causes rapid disappearance of foam, but reduces the viscosity of the solution; formic acid has a similar effect.

Patents—Miscellaneous

Petroleum

Catalytic hydration of olefines. No. 1,951,740. W. H. Shiffler & M. H. Holm, to Standard Oil Co., Calif.

Process for mfr. of esters. No. 1,951,747. L. P. Brezinski & P. K. Frolich, to Standard Oil Dev. Co., Del.

Mfr. of esters. No. 1,952,125. K. R. Edlund, to Shell Dev. Co., San Francisco.

Ketones from secondary aliphatic alcohols. No. 1,952,702. M. de Simo, to Shell Dev. Co., Calif.

Purification of hydrocarbon oils. No. 1,952,703. Carlton P. Dubbs, to Universal Oil Prod. Co., Chicago.

Chlorination of paraffin waxes. No. 1,953,286. E. J. Barth, to Sinclair Ref. Co., N. Y. City.

Preformed lead sulfide in caustic soda solution to sweeten gasolines and kerosenes. No. 1,954,103. G. L. Rowsey, Big Spring, Tex.

Treatment of hydrocarbon oils. Nos. 1,954,487-8. J. C. Morrell, to Univ. Oil Prod. Co., Chicago.

Mfr. of alcohols. No. 1,954,506. A. J. van Peski & W. C. B. Smithuysen, Amstel, to Shell Dev. Co., San Francisco.

Non-detonating motor fuel. No. 1,954,865. P. S. Danner, to Standard Oil Co., of Calif.

Refining of petroleum oil. Nos. 1,954,886-7. J. C. Morrell, to Univ. Oil Prod. Co., Chicago.

Motor fuel; of gasolene, benzol, toluol. No. 1,954,930. L. F. Magness, Baltimore.

Dephenolizing liquid hydrocarbon products. No. 1,955,023. H. Ross & E. Schwamberger, Ger., to Standard-I. G. Co., Linden, N. J.

Insecticides

Fertilizer neutralizing substantial part of free acid formed by soil. No. 1,951,742. M. W. St. John, to Jones & Laughlin Steel Corp., Pittsburgh, Pa.

Use of dolomite in dry fertilizers. No. 1,953,419. W. H. MacIntire, Knoxville, Tenn.

Trade-mark "Cresylic-ol", insecticides and fungicides. No. 335,250. Sherwin-Williams, Cleveland.

Copper phosphate-lime fungicide. No. 1,954,171. M. C. Goldsworthy, to Gov't & People of U. S.

Dichlor-diethyl ether contact insecticide. No. 1,954,517. E. W. Bousquet & W. H. Tisdale, to du Pont & Co., Del.

Insecti-, fungi-, and bactericidal compositions. No. 1,955,052. A. W. Burwell, to Alox Chem. Co., N. Y.

Lead and ferric arsenate insecticide. No. 1,955,114. W. M. Dickson, to Gen. Chem. Co., N. Y.

Furs

Mercuric nitrate, H peroxide, HNO_3 carroting solution for furs. No. 1,955,678. W. C. Mercier, to Am. Hatters & Furriers Co., Danbury, Conn.

Textile

As auxiliary products in the textile industry, a new compound, sulfocarboxylic acid amide. No. 1,931,540. W. Hentrich & H. Keppler, to I. G. F., Frankfort, Germany.

Company Booklets

C158. The Bakelite Corp., 247 Park ave., N. Y. City. With a "New Deal" sweeping the country on re-designing of packages "Restyling The Container To Increase Sales" is a particularly timely booklet. Specially well-illustrated.

C159. J. T. Baker Chemical Co., Phillipsburg, N. J. April issue of "The Chemist Analyst" features "Qualitative Tests for Bismuth" and "Analysis of Babbitt Metal" as well as a dozen or more laboratory suggestions of special merit. Analytical and research chemists can receive this instructive paper regularly.

C160. Eastman Kodak Co., Rochester, N. Y. April issue of "Synthetic Organic Chemicals" features an article on the Fries Reaction; discusses diphenylthio-carbazone—a new reagent for heavy metals; and shows a novel and compact steam set-up for steam distillation operations in the laboratory.

C161. E. I. du Pont de Nemours & Co., Wilmington, Del. "Acrin Tire Stocks"—Laboratory Report No. 171, announces and discusses this new rubber accelerator.

C162. E. I. du Pont de Nemours & Co., "Du Pont Rubber Dispersed Colors" (3rd edition) describes a color for every purpose in connection with rubber goods manufacture. Technical data is also supplied.

C163. General Plastics, North Tonawanda, N. Y. *The Durez Molder* for April discusses "Heat In Molding" as well as supplying interesting items on packaging; photos illustrating new uses for Durez, etc. This month's issue contains the splendid pace set by this "newsy" house-organ.

C164. General Plastics, North Tonawanda, N. Y. Divided into 3 sections, which are distinguished by the use of different colored paper, General Plastics, Inc., maker of Durez 100% phenolic oil soluble reactive resins for paint, varnish and lacquer manufacturing industry, has issued "Durez Resins" in which all possible formulations obtainable with Durez resins are presented. A white section contains data about 528 Durez resin, and a blue section shows information as to 500 Durez resin, while the 3rd, a buff section, presents knowledge as to Durez 550 resin. Blank sheets are also there in each section for use in collecting additional information about the various resins, these being removable sheets so that additional blank sheets for further data on the particular resin may be collated.

C165. General Plastics, North Tonawanda, N. Y. *Closure News* for April contains a dozen or more outstanding new adaptations in the plastic field by Durez.

C166. Givaudan Delawanna, Inc., 80 5th ave., N. Y. City. *The Givaudanian* besides giving a generous supply of pertinent news items asks and answers an important question—"Does Your Fly Spray Have A Pleasant Odor?" Also contains interesting formulas for cetyl alcohol (as a raw cosmetic material). This company has just recently started production of cetyl alcohol.

C167. Harshaw Chemical Co., Cleveland, Ohio. A most interesting and instructive booklet is "The Harshaw Chemical Company—A Presentation" containing as it does the personal family history of the Harshaws from the beginning in Scotland to the present time in America. Said W. Lawson, executive vice-president: "It has taken 42 years to write this booklet, yet it will take but a few minutes to read it; it is a story that reads like a romance and yet it is merely a recital of facts."

C168. Hercules Powder Co., Wilmington, Del. March issue of *The Hercules Mixer* features an instructive article on the history of ink; another on "Some Mechanics of Printing"; and in addition, the usual inter-company news, chiefly of a personal nature.

C169. Jefferson Lake Oil Co., New Orleans, La. A specially well-written exposition of the sulfur industry, beautifully illustrated. Discusses company plant and reserves. Should be in the files of every sulfur user.

C170. Mallinckrodt Chemical Wks., St Louis, Mo. April price list is ready for distribution. Buyers of medicinal, photographic, analytical and industrial chemicals should receive this price list regularly as a purchasing guide on price changes in these fields.

C171. Merck & Co., Rahway, N. J. *The Merck Report* for April, in its attractive new form, features a review of the work done in the 1st year by the Merck Research Laboratory; contains the interesting news that the 6th edition of that well-known work, the Merck Manual, will be published in June; and introduces a short, concise "News of the Markets" on the last page, giving inside news on probable price trends on several important items.

C171A. Merck & Co., Rahway, N. J. April price list with several important price revisions is now being distributed to buyers, etc.

C172. Michigan Alkali Co., 10 E. 40th st., N. Y. City. Company has just released new booklet on "Malium" gas. Booklet describes general fumigation principles; describes "Malium" as a clean, non-inflammable gas with no unpleasant or persistent odor.

C173. National Aniline & Chemical Co., 40 Rector st., N. Y. City. March issue of *Dyestuffs* discusses in detail the question of "Deviations From Good Quality Printing;" Wet Cleaning of Carpets;" "Notes on Hat Dyeing" and lists the new hosiery shades for Spring, 1934.

C174. The N. J. Zinc Co., 160 Front st., N. Y. City. Company is distributing reprint of an article on "Die Casting Advances Increase Applications" by R. L. Davis, and which appeared in *Machine Design*.

C175. Oakite Products, Inc., 22 Thames st., N. Y. City. *Oakite News Service* for March-April features an article on cleaning problems in the railroad industry.

C176. Philadelphia Quartz Co., 121 S. 3rd st., Philadelphia. This past month the editor of *P's & Q's* devotes space to the question of choosing the right silicate.

C177. R. & H. Chemicals Division, E. I. du Pont de Nemours & Co., Wilmington, Del. Quarterly price list has just been issued. This informative booklet not only quotes current prices of the products, but also contains pages of descriptions of such leaders as Artic, a refrigerant; non-flammable solvents; Duozinc for plating purposes; feldspars; peroxides; P. A. C. formaldehyde, and ceramic colors and other ceramic materials. The various chemicals discussed include those required in the chemical, metal, textile, rubber, leather, oil, ceramic and some other industries. In all, nearly 200 different chemical products receive mention or more or less detailed description.

C178. Rolls Chemical Co., Ellicott Square Bldg., Buffalo, N. Y. *Retorts* is a well-balanced house-organ, giving personal news items, informative tips of chemicals and their uses, etc.

C179. S. Schwabacher & Co., 59 Pearl st., N. Y. City. Oelwerke Julius Schindler, G.m.b.H., Hamburg, Germany, one of the foremost European refiners of Russian mineral oil, is celebrating its 25th anniversary. Commemorating the event the company has prepared one of the most beautiful brochures that this department has ever had the pleasure of looking through. The photography and general artistic presentation can only be described by superlatives. S. Schwabacher & Co. represents the Schindler firm in this country. The latter produces all kinds of high-grade lubricating oils, transformer oils, specially high-grade white oils for the chemical and cosmetic industries; medicinal oils; and paraffins of various types.

C180. Toledo Synthetic Products, Inc., 2112 Sylvan ave., Toledo, Ohio. Company manufactures "Plaskon" and a new booklet contains pertinent information on the physical characteristics and molding properties as well as illustrations in color showing the hundreds of uses to which the product has been adopted.

C181. American Cyanamid Co., 30 Rockefeller Plaza, N. Y. City. May-June issue of *American Hortigraphs and Agronomic Review* is ready for distribution.

Chemical Industries,
25 Spruce Street, New York City.

I would like to receive the following booklets; specify by number. .....

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C. May

Chemical Production

A digest of plant management, design, equipment and containers for the makers of chemicals.

The Centrifugal or Turbine Pump in Chemical Operations

The centrifugal or turbine pump has many applications of great value to the chemical industry. It is of small dimensions and high efficiency. If properly designed maintenance and running costs are low and the life is long and trouble-free. It cannot be of too great importance, however, to emphasize care which should be taken in selecting design to meet requirements and characteristics of liquid to be dealt with.

The ordinary centrifugal or turbine pump designed for dealing with clean water may be used for pumping many chemicals, but, frequently, liquids have to be dealt with whose characteristics are such as to make the ordinary type of centrifugal pump—designed for dealing with water—ineffective or subject to rapid wear. Its purpose in the chemical industry may be roughly classified under three main headings:—(a) When the liquid to be dealt with has to be raised from one level to another in the factory; (b) circulating the liquid through cooling or heating systems or for mixing purposes; (c) when the liquid has to be extracted from a chamber under vacuum or where required to force the liquid through a filter, or similar apparatus.

When the liquid is of a corrosive nature analysis of the liquid should be examined with a view to determining the material of which the pump should be constructed. In many cases it may be found that an alloy or a metal can be chosen which is practically unaffected by the corrosive action of the chemical to be dealt with. It is frequently possible to manufacture a pump entirely in cast iron, as when dealing with caustic soda. In other cases, pumps may be constructed of cast iron containing nickel, chromium, etc., percentage of nickel being adjusted to suit the conditions under which the pump has to work. Frequently non-ferrous metals can be utilized, sometimes a pump may be made entirely of aluminum alloy.

When dealing with an acid such as dilute sulfuric, stoneware pumps form a general solution to the corrosion problem and can be used for many chemicals which cannot be dealt with by a pump constructed of metal. It is frequently found that a pump manufactured of some relatively cheap alloy, while costing less than a stoneware pump in the first instance, has to be replaced so frequently that the installation of a stoneware-lined pump in the first instance would make a more economical proposition.

In many cases in the chemical and allied industries it is desired to pump liquids which contain abrasive material in suspension. The problem to be faced is one of rapid wear of the impeller and internal parts of the pump. The problem resolves itself into the selection of a suitable material, together with a design of pump in which the wearing parts are of very robust dimensions and the hydraulic features such that these wearing parts can be eroded away to a very great extent before the efficiency and output are sufficiently marred to make replacements necessary. The materials often adopted are specially hard iron, white iron, or, in extreme cases, manganese steel.

Should the solids be of large dimensions the passages through the pump have then to be of sufficient size to pass these solids without choking or jamming.

It is sometimes found that the liquid carrying abrasive matter in suspension is of a corrosive nature. Here again special consideration has to be given to the material of which the pump is to be made. This material must have a combined abrasion-resisting and corrosion-resisting characteristic. It will be appreciated that this presents an extremely difficult problem on account of the corrosion accelerating the erosive effect. In some cases rubber-lined pumps have been found effective where the temperature and other conditions are not deleterious to the life of the rubber, and where the design of the pump can be made such that the adhesion of the rubber to the metal can be ensured.

Should the temperature of the liquid to be dealt with be relatively high special precautions have to be taken. In the first place the suction lift or the vacuum which the pump will have to create must be limited so that the absolute pressure in the eye of the impeller is well above that at which the liquid would vaporize. It is practically impossible to avoid at least slight cavitation due to the flow of liquid past the inlet tips of the blades of the impeller. This has the effect of reducing the pressure locally below that of the main pressure in the eye, and, if this pressure is too near to the pressure at which the liquid will turn to vapor or steam, then the pump will cease to function or will work unsatisfactorily.

When this point is borne in mind it will be realized that where the temperature of the liquid to be dealt with is near to the possible boiling point, the pump will not raise the liquid on the suction side, and it frequently becomes necessary to place the pump at such a level that it is several feet below the level of liquid in the tank from which the pump is drawing. When it is necessary for the pump to draw from a chamber in which a vacuum has been created, similar precautions must be taken to prevent liberation of vapor in the eye.

Where the temperature of the liquid is high care must be taken in the design of the pump, and it is frequently necessary to arrange that the casing is mounted from the centre line so as to avoid mis-alignment at high temperatures. Further, the bearings and sometimes the glands may have to be water-cooled, so as to ensure successful operation. The electric motor may have to be mounted on insulating material and shielded in such a way that the heat is not transmitted to it.

Value of the viscosity of the liquid may have a profound effect on the hydraulic performance of the pump. Should this viscosity be relatively high the output and head generated for a given pump would be considerably less on a viscous liquid than when pumping water, and the power absorbed considerably higher. It is therefore necessary for the pump manufacturer to have full particulars of the viscosity of the liquid so that he may select a pump whose hydraulic characteristics are suitable for the conditions involved.

The specific gravity of the liquid must also be taken into consideration. For liquids of the same viscosity, but with different specific gravities, the horsepower increases approximately in proportion to the specific gravity, and for a given speed and quantity the pressure generated in lb. per sq. in. also increases in this ratio. Here, again, the pump manufacturer must be made aware of the conditions involved so that when deciding on the size of prime mover he can determine what is the maximum power which may be absorbed. Incidentally this also applies to the head. In most designs of centrifugal pumps, as the head against which the pump is discharging is reduced, so the quantity increases and the horsepower absorbed rises. If therefore becomes necessary to inform the pump manufacturer of the highest and lowest heads against which the pump may be required to discharge.

It is frequently necessary to pump liquids which are highly volatile and flammable. Careful precautions must be taken in the design to render the plant immune from the danger of fire. Another danger which must be guarded against is leakage from the glands of liquid which may quickly evaporate and form an explosive gaseous mixture. Another danger which must be guarded against is the generation of electrostatic discharges. Many volatile and flammable liquids are relatively high electrical insulators. It will be realized that static discharges may be generated due to the impeller and other rotating parts of the pump revolving in an insulating medium, possibly in the presence of dissimilar metals.

Additional Safety Precautions Necessary

The type of prime mover must be considered carefully. If an electric motor, it is frequently found advisable to arrange for the pump itself to be installed in one room and the motor in another room with a thin partition wall between, the drive being by means of a shaft passing through a stuffing box and gland in the wall. The starter for the motor, of course, would be accommodated in the motor room. By this means any sparking which may occur in the motor or the starter cannot ignite any flammable vapor which may have leaked from the pump gland. As an alternative the motor driving the pump may be of the flameproof type with the starter of similar construction.

Design of the pump for any particular conditions, as outlined above, must be considered carefully. It will be realized that frequently combinations of characteristics of the liquids are experienced and each particular factor must be given careful consideration. In general it is not desirable that the pump should have any internal bearings or bushes which can come in contact with the liquid owing to the possibility of contamination of liquid by lubricant, or chemical action making the lubricant ineffective. *The Chemical Age*, March 17, p. 221.

Heavy Chemicals

Beryllium Compounds In Lithopone

In a recently published German patent it is claimed that the use of beryllium compounds in the production of light-fast lithopone, unlike that of cobalt compounds, is advantageous in that the white color and brightness of the lithopone do not suffer. Following compounds can be used: Beryllium nitrate, acetate, oxalate, sulfate, chloride, carbonate, and oxide, and they can be added at any stage in the lithopone-making process, although it is advantageous to incorporate beryllium compounds before final drying and grinding of the pigment. Quantity of beryllium compound that is effective is markedly reduced when the beryllium is precipitated as hydroxide by means of soluble alkali and removal of excess alkali by washing. A preferred method of working is to add solution of beryllium sulfate to purified zinc salt solution.

Caustic Soda From Sodium Nitrate

Caustic soda, according to a process developed by Dr. P. Krassa, Santiago, Chile, is made by the action of iron oxide on sodium nitrate at high temperatures in the presence of air or other gases, and the subsequent decomposition with water of the sodium ferrite obtained. Amorphous silica can advantageously be added to the mixture of sodium nitrate and iron oxide.

Acid Ammonium Fluoride By a New Process

New method for acid ammonium fluoride production utilizes gaseous ammonia and gaesous hydrofluoric acid. Equipment necessary: (1) A wooden lead-lined reaction vessel fitted with an agitator, cooling coil, pipes for introducing and evacuating the gases, an arrangement for taking samples, a connecting pipe to a lead-lined centrifugal and another connecting pipe to a lead-lined centrifugal pump. (2) An ammonia cylinder connected to the reaction vat by a leaden pipe. The centrifugal is connected by leaden piping to a lead-lined vat for the filtrate.

In carrying out the process, water is charged into the reaction vessel and gaseous hydrofluoric acid passed in until a concentration of 35-40° Be. is obtained. Hydrofluoric acid stopcocks are then closed and ammonia gas led in, at first slowly and then more rapidly, agitation being well maintained and cooling being continuous. Ammonia is added until solution shows a slightly alkaline reaction. Neutral fluoride which has formed partially precipitates. Ammonia is shut off, and then the solution again saturated with the hydrofluoric acid gas. Acid fluoride of ammonia is formed, and is precipitated. It is separated by centrifuging, the mother liquor being returned by the centrifugal pump to the reaction vat, where it is re-utilized after saturation with hydrofluoric acid gas.

New German Process for Acetyl Chloride

Acetyl chloride is prepared in a German patented process by the interaction of liquid acetic acid and gaseous phosgene at a raised temperature and approximately normal pressure under conditions whereby the acetyl chloride produced is continuously removed by evaporation. As catalysts, use may be made of such compounds of metals of the 2nd and 3rd periodic groups as are soluble in hot acetic, for example, magnesium oxide, anhydrous calcium chloride, or aluminum acetate. Examples are given in which the reaction is effected at 80 or 110° C. in a vessel connected to a condenser which returns any acetic anhydride formed to the vessel, the acetyl chloride and the gaseous reaction products passing from the condenser to a refrigerator, and fresh acetic acid being continuously run into the vessel; the phosgene may be passed in through a porous plate in the vessel, and the gaseous reaction products undergoing cooling may be washed with a liquid which absorbs acetyl chloride without absorbing much hydrogen chloride; suitable washing liquids are mixtures of acetic acid and acetic anhydride, and also hydrocarbons and their halogen- or nitro-derivatives, such as chloronaphthalene.

Chlorination Reactions

In chlorination reactions (new methods for the halogenation of organic compounds through the use of de-chlorurea) the best results are obtained in hydrochloric acid media. Reaction is accompanied by considerable heat evolution, but is effected very rapidly, and does not give rise to the formation of gaseous products. Reaction takes place in 2 ways: 1st being the complete hydrolysis of the di-chlorurea with the formation of carbon dioxide, nitrogen chloride, and free ammonia; and the 2nd being the hydrolysis of the di-chlorurea into free urea and hypochlorous acid. The advantages claimed for the process are claimed to be rapid chlorination and the production of mono- and di-chlorinated derivatives in aqueous solutions.

Following method is given for the mono-chlorination of resorcinol: 16.5 grams of resorcinol are dissolved in 75 cc. of water; 10.17 grams of di-chlorurea (a 5% excess) are added, and the

mixture is agitated energetically while 1 cc. of concentrated hydrochloric acid is added. The di-chlorurea dissolves, and the flask is cooled externally to keep its temperature below 35° C. The monochlor-resorcinol is extracted with ether from the reddish colored aqueous solution.

Bromination is carried out with a mixture of di-chlorurea and potassium bromide, the 1st step being the formation of the rapidly decomposable di-bromurea, while iodination is effected with mixtures of di-chlorurea and potassium iodide. The sulfocyanation of aromatic compounds is effected in a similar manner, in this case the di-chlorurea being employed in conjunction with ammonium sulfocyanide. It is stated that this last-mentioned reaction is very rapid, and is completed before any undesired oxidation phenomena can make their presence felt. During the course of the investigation of this last-mentioned reaction, the discovery of the existence in ethereal solution of a new urea derivative (namely, symmetrical di-sulfocyanurea) was made.—M. V. Likhocherstov (*J. Obchtch. Khim*, '33, 3, p. 164-197).

New Chemical and a Novel Use

Recent investigations at Mellon Institute have indicated probable valuable applications of metaphosphate of soda in the field of veterinary medicine. This previously little-used chemical is now available in powder form for preparing solutions reported to be of high utility for washing and rinsing dogs and other furred animals. A special preparation of the metaphosphate, rendered slightly alkaline with borax and perfumed with a very little oil of cedar, is used.

Industrial Chemical Patents

Normal propyl alcohol. No. 1,953,548. C. O. Young & G. H. Law, to Carbide & Carbon Chem. Corp., N. Y. City.

Recovery of carotene from plants. No. 1,953,607. H. N. Holmes & H. M. Leicester, to S. M. A. Corp., Cleveland.

Making alkyl benzenes. No. 1,953,702. J. G. Davidson, to Carbide & Carbon Chem. Corp., N. Y.

Stable, water-soluble reaction product of glycols and boric acid. No. 1,953,741. H. Bennett, Brooklyn.

Sodium aluminate in vitreous enamel slips. No. 1,953,760. R. M. King, to National Aluminate Corp., Chicago.

Titanium phosphate pigment. No. 1,953,777. Saklatwalla, Dunn & Marshall, to So. Min. Prod., Corp., N. Y.

Thermoplastic products of aqueous solution of wood fiber and urea. No. 1,953,832. O. W. Sandell, to Akt. M. O. D. Wallboard Co., Sweden.

Making sodium pyrosilicate hydrate. No. 1,953,840. M. C. Waddell, to Grasselli Chem. Co., Cleveland.

Acid setting baths used in art. silk making. No. 1,953,868. G. A. Richter & J. G. Gosselink, to Brown Co., N. H.

Carbon tetrachloride-ceresin wax lubricant for ammunition. No. 1,953,904. W. W. Bowyer & G. H. Jacobs, to Peters Cartridge Co., Cincinnati.

Preparation of acetic acid. No. 1,953,905. R. L. Brown, to Atmos. Nitrogen Co., N. Y.

Freeing ammonia from organic impurities by air-reaction. No. 1,953,938. A. O. Jaeger, to Selden Co., Pittsburgh.

Means by zinc oxide of making shellac-metal-radical compound. No. 1,953,951. W. A. Boughton, to New Eng. Mica Co., Waltham.

Neutralization by contacting oil-treated H_2SO_4 with powdered dolomite. No. 1,954,116. L. Caldwell, to Cal. First Nat. Bank, Long Beach.

Cell. acetate coating for rubber cement articles. No. 1,954,219. H. E. Moyses, N. Y.

Physico-chem. recovery of sulfur. No. 1,954,279. R. F. Bacon, Bronxville, N. Y.

For inhibiting rubber deterioration. No. 1,954,377. W. S. Calcott & W. A. Douglass, to du Pont & Co., Wilmington.

Formation of nitrates of alkali earth elements. No. 1,954,415. H. B. Kipper, to H. B. Knox, N. Y.

Preparation of acid amides. No. 1,954,433. C. A. Thomas & J. F. Olin, to Sharples Solvents, Phila.

Chlorinating aliphatic hydrocarbons. No. 1,954,438. Britton, Coleman & Hadler, to Dow Chem. Co., Mich.

For amino-diphenyls. No. 1,954,468. C. F. Booth, to Swann Res. Inc., Ala.

Process for benzidine and other arylamines. No. 1,954,469. C. F. Booth, to Swann Res. Inc., Ala.

Production of isoviolanthrone. No. 1,954,482. F. Knowles, to du Pont & Co., Del.

Derivatives of diphenylmethane. No. 1,954,484. E. L. Mattison, to du Pont & Co., Del.

Leuco-compounds of vat dyes. No. 1,954,702. J. G. Kern, to du Pont & Co., Del.

Making amino-arylthioglycollic acids. No. 1,954,706. H. A. Lubs & J. E. Cole, to du Pont & Co., Del.

Thioglycol-amino-alkoxy benzene derivatives. No. 1,954,707. H. A. Lubs & J. E. Cole, to du Pont & Co., Del.

Soluble chem. mixture for pickling baths of ferrous metals. No. 1,954,743. O. L., H. L. & C. E. Peterson, to Delaney Chem. Co., Pa.

For treating metal surfaces. Nos. 1,954,744-5. O. L., H. L. & C. E. Peterson, to Delaney Chem. Co., Pa.

Liquid hydrocarbon and non-drying oil for hide degreasing. No. 1,954,798. J. H. Conner & M. M. Merritt, to Tanning Process Co., Boston.

Zinc sulfide pigment in paper making. No. 1,954,799. H. M. Cyr, to N. J. Zinc Co., N. Y.

Improved chamber process for production of sulfuric acid. No. 1,954,880. W. H. Leverett, to Nat. Zinc Co., N. Y.

Pure liquid ammonia from ammoniacal gases. No. 1,954,973. R. Zaniboni, La Spezia, Italy.

Obtaining alkylated phenols. No. 1,954,985. H. E. Buc, to Standard Oil Dev. Co., Del.

Two miscible liquids, volatile and solvent respectively, and use as process of purifying substances. No. 1,955,016. E. C. Prins & J. F. Lemmens, Dordrecht.

Precipitating and separating sodium nitrate and ammonium chloride. No. 1,955,031. W. Stedemann, Altenburg, Ger.

Aqueous solution and chromium process for butadiene from diacetylene. No. 1,955,046. P. Baumann & H. Tanneberger, to I. G. F., Frankfort.

Formaldehyde process for dimethylol ketones. No. 1,955,060. W. Flemming & H-D. v. d. Horst, to I. G. F. Frankfort.

Artificial masses from aliphatic aldehyde-polymerized vinyl alcohol. No. 1,955,068. Hopff and Kuehn, to I. G. F., Frankfort.

Anhydrous alkali metal phenoxides. No. 1,955,080. L. E. Mills, to Dow Chem. Co., Mich.

Solid cellulosic agglutinant and liquid solvent softener. No. 1,955,083. R. Mueller, to C. F. Boehringer & Soehne, Mannheim.

Caustic soda and azanthate steeping process for fiber. No. 1,955,092. G. A. Richter, to Brown Co., Berlin, N. H.

Mothproofing agent—arylsulfonic acid amide. No. 1,955,207. Stotter & Hermann, to I. G. F., Ger.

Copper-ammonia-fibroin solutions. No. 1,955,221. Borner, Rossner, Mahn & Irion, to I. G. F., Ger.

For alkali metal cyanides. No. 1,955,229. Drucker, Lueg & Weise, to I. G. F., Ger.

Electro-osmotic purification of glycerine. No. 1,955,237. A. Jenny, to Siemens-Elek.-Osmose G.m.b.H., Berlin.

H from hydrocarbons heavier than methane. No. 1,955,290. R. T. Haslam, to Standard Oil Dev. Co., Del.

Trade-mark, new high-melting point stearic acid. No. 311,423. Will & Baumer Candle Co., Syracuse, N. Y.

Colloidal alkali metal halides. No. 1,951,354. Est. Ernest Govett, to Govett, Ltd., New York.

Colloidal bromine and bromide. Nos. 1,951,355-6. Est. Ernest Govett, to Govett, Ltd., New York.

Mfr. of dicarboxylic acid chlorides. No. 1,951,364. L. P. Kyrides, to Monsanto Chem. Co., St. Louis.

Treatment basic alums for hydrated alumina and sulfates. No. 1,951,443. Est. Walter M. Sanders, Montclair, N. J., to Kalunite Co., Del.

Treatment by CO_2 for a compound fertilizer. No. 1,951,489. J. P. L. Remy-Neris, to Ste. Chim. de la Grande Paroisse, Paris, France.

Granular dry urea with no decomposition products. No. 1,951,518. W. Meiser & W. V. Knilling, to I. G. F., Frankfort, Germany.

Hydrocyanic acid from formamide vapors. No. 1,951,520. E. Munch & F. Nicolai, to I. G. F., Frankfort, Germany.

Zinc chloride with cellulose to prepare activated carbon. No. 1,951,538. G. J. L. Tielens, to "Maximine" Soc. Anon., Verviers, Belgium.

Abrasive grain surfaced by metal salts in sodium silicate. No. 1,951,555. J. S. Masin, to Swann Res. Inc., Birmingham, Ala.

Process for mono and dichlor isomers of diphenyl. No. 1,951,577. J. E. Malowan, to Swann Res., Inc., Birmingham, Ala.

Esters of long chain monochydric alcohol. No. 1,951,593. T. F. Bradley, to American Cyanamid Co., N. Y. City.

New process for and product from arylacetic acids. No. 1,951,686. Wolfram, Schornig & Hausdorfer, Ger., to Gen. Anil. W'ks, N. Y. City.

Alkali metal salts of fatty acids from olefines. No. 1,951,696. M. Hofsasz, Ger., to Shell Dev. Co., San Francisco.

Ozonation products of terpene alcohol. No. 1,951,708. L. P. Rankin, to Hercules Powder Co., Wilmington, Del.

For making esters of acrylic acid. No. 1,951,782. W. Bauer & H. Lauth, Ger., to Rohm & Haas, Philadelphia, Pa.

Sulfuric acid esters. No. 1,951,784. H. Bertsch, to H. T. Bohme, A-G., Chemnitz, Germany.

Acetic acid free from acetaldehyde. No. 1,951,789. Mueller-Cunradi, Pieroh & Giehne, to I. G. F., Frankfort, Germany.

Process and apparatus for making hydrated calcium chloride. No. 1,951,886. C. Sundstrom, to Solvay Company, Syracuse, N. Y.

Phosphorus from dilute gases. No. 1,951,984. Kerschbaum, Waggaman & Gooch, to Pembroke Chem. Corp., Lake Wales, Fla.

Separation of acid gases from mixtures. No. 1,951,992. G. A. Perkins, to Carbide & Carbon Chem. Corp., N. Y. City.

For reducing viscosity of a colloidal suspension of proteins. No. 1,952,017. A. Leighton, Cottage City, Md., and A. Leviton, Wash., D. C.

Process for direct synthesis of ammonia. No. 1,952,021. F. C. Reed, Kansas City, Mo.

Silicic acid-guhr catalyst. No. 1,952,057. F. A. F. Crawford and W. A. P. Chellenor, to Imp. Chem. Inds. Ltd, England.

Polymerization of unsaturated aliphatic hydrocarbons. No. 1,952,116. P. W Bridgman & J. B. Conant to du Pont & Co., Wilmington.

Ferric salt-ferricyanide method of multicoloring coal. No. 1,952,180. H. S. Mork., Brookline, to Delaware, Lackawanna & Western Coal Co., N. Y. City.

Recovering arsenic from metallurgical waste. No. 1,952,290. W. Schopper, to Norddeutsche Affinerie, Hamburg, Germany.

Cashew nut shell-casein-alkaline composition. No. 1,952,313. M. T. Harvey, to Harvel Corp., N. J.

Resin-acid compositions in the carboxyl group. No. 1,952,367. E. Fonrobert & F. Lemmer, to Resinous Prod. & Chem. Co., Philadelphia, Pa.

Resinous complexes; glyceride with dihydric alcohol and phthalic anhydride. No. 1,952,412. T. F. Bradley, to Ellis-Foster Co., Montclair, N. J.

For diazodi-nitrophenol. No. 1,952,591. R. S. Hancock & L. C. Pritchett, to Hercules Powder Co., Wilmington, Del.

Condensation products of urea and formaldehyde. No. 1,952,598. Luther, Pungs, Griessbach & Heuck, to I. G. F., Frankfort, Germany.

Method for HNO_3. No. 1,952,633. J. H. Shapleigh, to Hercules Powder Co., Wilmington, Del.

Mixed fertilizer. No. 1,952,849. C. Eyer & F. Korn, to I. G. F., Frankfort, Germany.

Saturated acids by dissociation and hydrogenation. No. 1,952,871. H. Kaufmann, Jena, Ger.

Hydrochloric acid activation of catalysts. No. 1,952,911. F. J. De Rewal, to Atmos. Nitrogen Co., N. Y. City.

Baking powder—potassium carbonate, calcium acid phosphate, kieselguhr and fine flour. No. 1,952,947. C. F. H. Schott, Darmstadt, Ger.

Purification of chlornaphthalenes. No. 1,953,070. Sandford Brown & E. R. Hanson, to Halowax Corp., N. Y. City.

Paper waxing compo.-paraffin, sodium silicate, alum. No. 1,953,085. G. J. Manson, Hawkesbury, Ont.

Chem. extraction of alumina from clay. No. 1,953,144. W. S. Wilson, to Merrimac Chem. Co., Boston, Mass.

Synthetic rubber, by polymerizing diene hydrocarbons. No. 1,953,169. W. A. Gibbons, Montclair, & E. M. McColm, Sumatra, to Naugatuck Chem. Co., Conn.

Low water hydrate from aluminum trihydrate. No. 1,953,201. M. Tosterud, to Aluminum Co. of Am., Pittsburgh, Pa.

Continuous acetic acid from acetaldehyde. No. 1,953,381. K. Wiesler, to Deutsche G. und S. Roessler, Frankfort, Germany.

Polymerization of diolefines. No. 1,953,468. Ebert, Fries & Garbsch, to I. G. F., Frankfort, Germany.

Removal of H, S, and ammonia from gases. No. 1,953,478. C. J. Hansen, Ger. to Koppers Co., Pittsburgh, Pa.

Guanidines from substituted thiourea. No. 1,953,494. A. Meis, to I. G. F., Frankfort, Germany.

Acetone from acetylene. No. 1,953,499. W. Pohl, to Deutsche G. und S. Roessler, Frankfort, Germany.

Antifreeze solutions. No. 1,955,296. F. A. Howard, to Standard Oil Dev. Co., Del.

For chromates and dichromates. No. 1,955,326. J. E. Demant, to Bozel-Maletra Ste Ind., Paris.

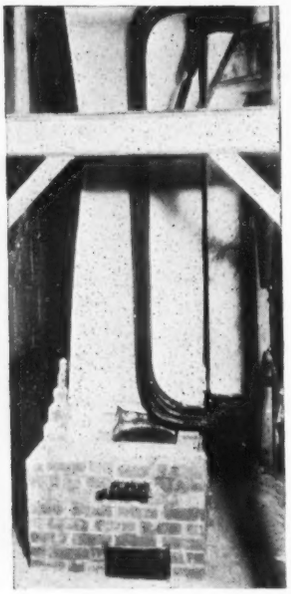
Selenium modified castor oil. No. 1,955,348. W. M. Stanley, to du Pont & Co., Del.

Aluminum cetylacetate treatment of paraffin wax . No. 1,955,527. H. Bennett, Brooklyn, N. Y.

New Equipment

Interesting possibilities are presented with a new miniature electric-heated steam-generated line in small popular capacities ranging from 2 to 18 kilowatts, equivalent to 6 to 54 lbs. of steam by weight generated per hour. Steam pressure ranges are: 0-100, 0-200, and 0-300 lbs. gauge. These miniature steam boilers are ideally suited for small scale production; in testing presses in plastics work, etc. The "seasonal aspect" will enable plants equipped with these small boilers to shut down big main heating boiler equipment with resulting worth-while savings. **QC 120**

A most interesting application of high pressure steam to process, where a sustained high temperature is essential, is to be found in a small 1500-lb. pressure boiler that a large manufacturer in one of the process industries is now installing for experimental purposes. The idea underlying the use of saturated steam at this pressure was its ability to supply heat at a constant delivered temperature of 575 Fahr. to the particular process. Obviously, superheat and a lower steam pressure would not have provided a sustained temperature during process, for as heat was given up the superheat would drop. If the experiments with steam from this miniature boiler work out satisfactorily it is contemplated to install a full size unit to supply steam at this pressure for regular production. There are undoubtedly processes in other industries wherein this principle could be applied to advantage. The experimental unit consists of a single row of tubes entering top and bottom headers which are connected by a single downcomer. The tubes are 1 in. outside diameter and the headers of forged steel, rectangular in section, placed 7 ft. 2 in. between centers. Total heating surface is slightly over 9 sq. ft. and the furnace will be a simple refractory lined chamber. Photograph shows the boiler before being bricked in. The boiler is gas fired, is of the single-pass type and will be hand controlled. Because of its size, experimental use and simple construction no attempt to attain a high efficiency in this unit. **QC 121**



A well-known equipment manufacturer is now supplying some of its blowers, vacuum pumps, and gas pumps connected through a variable speed drive to a constant speed motor. It is pointed out by the manufacturers that, where variations in the volume are required, a unit of this type offers many advantages in the process industries.

In the rotary positive type of machine, the power consumption varies in almost direct proportion to the volume and the pressure being delivered; thus the use of a variable speed arrangement permits this economy to be carried through the entire operating range. Savings of this kind, coupled with the convenience afforded by flexibility as to volume and pressure, account for the growing use of this type of drive.

Equipment arranged in this way is especially suitable for those industries where seasonal peaks or processing technique makes changes in the volume advantageous or necessary. Applications of this sort are to be found in chemical plants, paper mills, ice plants, gas works, oil refineries, sugar mills, and many other processing plants. Variable speed drives have also been used in connection with cycloidal rotary pumps, which are built for heavy duty service, including the handling of viscous liquids, or for producing vacuums up to 26 inch Hg, for handling vapor and liquid together. **QC 122**

A new type closure for collapsible tubes, air-tight and stronger than the tube walls, themselves, has been developed. With this closure, manufacturers will be able to avoid losses they have suffered from leakage and corrosion. Seepage of chemicals, oils, alcohol, glycerine and similar products is eliminated. **QC 123**

Non-soluble, non-corrosive and non-oxidizing, a new sealing compound in a paste form, can be spread as thin as .001 inch, seals instantly, yet never hardens or becomes brittle. Used in connection with gaskets, or as a seal for flanged or threaded joints in fuel oil, steam, water, air, gasoline, lubricating oil or in any type or size of pipe lines, it can not be washed out, is unaffected by atmospheric conditions, heat resisting up to 400 degrees Fahr., prevents rust or corrosion, may be applied on any material or surface, seals as perfectly as shellac, yet permits quick and easy disassembly at any time. Being completely free of grit and with its highly lubricant castor oil base, it is an effective rust preventative for threaded connections, and a corrosion preventive on electrical connections, battery terminals, etc. **QC 124**

A general-purpose welding electrode has been announced. New electrode is of the heavily coated or shielded-arc type and produces welds of the quality required for Class I pressure vessels according to the A.S.M.E. Boiler Construction Code. Its distinctive feature is that it may be used in any position, that is, for flat, vertical, or overhead welding, and at the same time has deep penetrating properties. It is therefore equally suitable for butt and fillet welds. **QC 125**

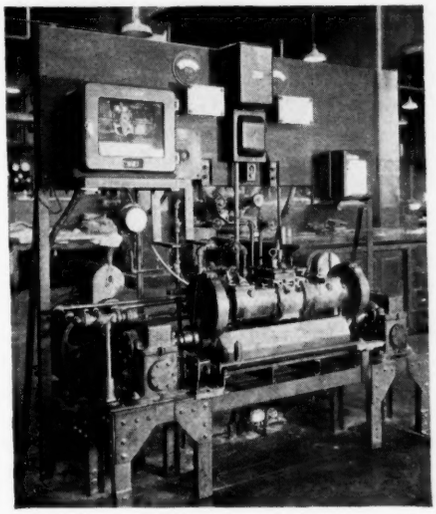
An improved series of acid pumps has been developed. Pumps are stoneware lined and claimed to be absolutely incorrodible. The casing, impeller and all parts coming in contact with the corrosive solution are made of chemical stoneware, de-aired and vacuumized for greater strength. In addition, a cast-iron outer shell gives the pump a permanent protective armor, enabling it to stand rough handling. Following features are claimed: 1. double packing gland which prevents all spraying; 2. semi-automatic gland adjustment; temperature compensation to maintain constant gland pressure; 3. adjustable impeller clearance; the chemical stoneware impellers functioning perfectly at 1750 r.p.m.; 4. accessibility, permitting the rapid removal of any wearing part; absolute standardization of all parts; 5. all stoneware parts ground-into the protecting armor, rather than being cemented-in; 6. corrosion-resisting alloys used for all metal parts that may be injured by fumes of highly volatile liquids; 7. pump bearings may be taken up without altering the impeller alignment; 8. material reduction in floor space for a given pumping capacity, with an over-all efficiency equal to similar sized all-metal pumps.

The construction is solid and sturdy, maintenance costs low, the efficiency high and the gland performance, it is stated, surpasses that of most all-metal pumps. The design is particularly adaptable for the handling of fluids and semi-fluids which are abrasive or contaminated with impurities. Impellers are balanced with the utmost precision and their strength tested on 300% over-loads. **QC 126**

To provide greater uniformity in loading dryer trays and to guard against over drying at the edges of the trays a new tray loader has been developed which arranges material into individual strips of standard width and thickness which are laid down in the trays with ⅜ in. spacing between strips. Lumps and air spaces are eliminated and drying surface is said to be increased by as much as 200%, more than making up for the smaller volume of material placed in the trays. Per lb. of material and for equal depth, drying cycles are said to be reduced by as much as 50%. Worthwhile economies are claimed over hand filling. **QC 127**

A new copper-beryllium alloy is being recommended for the manufacture of non-sparking tools employed in industries where explosive and flammable materials are processed. **QC 128**

A new special construction of a laboratory mixer has recently been put into service in the laboratories of one of the large Akron rubber plants. Outstanding feature is the twin motor drive, front and rear blades being driven independently through speed reducers by two 3 HP, D. C. motors with separate variable speed controls. This arrangement permits of individual variation of mixing blade speeds and, consequently, of wide variation in the ratio of front blade to rear blade speed. It is now possible to study the effect of blade speed ratio variation on the time and power required to obtain a given degree of dispersion. Mixing blades are interchangeable and when using the heavy masticator blade designed for rubber compounding and similar solid dispersions, the capacity of the mixer is about 1500 c.c. While with the lighter types of mixing blades the machine is suitable for work involving ordinary mixing and kneading problems, its heavy construction permits the application of power as required for the hardest kind of work as breaking down and compounding rubber stocks, dispersion of pigments into nitro-cotton, resins and similar plastics. **QC 129**



Mixer's panel carrying control and recording instruments for power blade speeds and temperatures of batch and jacket.

A complete line of instantaneous and time delay plunger-type relays for protection against overcurrent and undervoltage, and for use as auxiliary relays, has recently been announced. Same principle of operation is common to the entire line and depends upon the action of a magnet coil in attracting or releasing a plunger when predetermined values of voltage or current are present in the coil circuit. Mechanical design is unique, as the relays are all single-pole, and include a variety of adjustments and convertible features. The instantaneous overcurrent relay can be changed from time to delay on contact opening, contact closing, or both, by simply placing a poppet in the proper hole. Likewise, by simply turning a cap, the air intake or out-take to the bellows can be regulated to change the time delay in the opening or closing of the contacts. The time delay is dependable because the bellows are made of super-aging rubber which does not require lubrication and which is unaffected, either in its action or durability, by high or low temperatures. Other features include the changing of hand-reset to self-reset contacts, and from circuit opening contacts to circuit closing contacts. **QC 130**

Chemical Industries,
25 Spruce Street,
New York City.

I would like to receive more detailed information on the following: (Kindly check those desired).

QC 120	QC 124	QC 128
" 121	" 125	" 129
" 122	" 126	" 130
" 123	" 127	

Name.....

Title.....

Address.....

Equip. May

Patents—Coal Tar

N-containing conversion products of hydrocarbon. No. 1,948,924. K. Keller, to Gen. Anil. W'ks, N. Y. City.

Substituted benzo-carbazole-carboxylic acid. No. 1,948,923. Kalischer, Limpach & Hagar, Ger. to Gen. Anil. W'ks, N. Y. City.

N-sulfonic acid and oxidizing agent, to be used in dyeing and textile printing. No. 1,948,589. M. Mendoza & A. G. Murray, to Imperial Chem. Industries, England.

Red-blue-green azodyestuffs. No. 1,948,224. E. E. Misslin & R. von Capeller, to Ste. of Chem. Ind., Basel, Sw.

Red to violet azodyestuffs. No. 1,948,208. F. Felix & W. Huber, to Ste. of Chem. Ind., Basel, Sw.

Anthraquinone derivatives. No. 1,948,183. Paul Nawiasky & A. Krause, to Gen. Anil. W'ks, N. Y. City.

Dipyrazol-anthronyl series vat dyes. No. 1,948,178. M. A. Kunz & K. Koeberle, Ger., to Gen. Anil. W'ks, N. Y. City.

Blue dyestuff and intermediates. No. 1,948,116. D. C. Rhys Jones & R. Fraser Thomson, Scotland, to Imperial Chemical Industries, England.

Azo dyestuffs insoluble in water. No. 1,947,946. L. Laska & A. Zitscher, Ger., to Gen. Anil. W'ks, N. Y. City.

Azo dyes. No. 1,947,945. W. Lange, to Gen. Anil. W'ks, N. Y. City.

The production of isoviolanthrone. No. 1,947,858. L. P. Kyrides, Buffalo, to Nat'l Anil. & Chem. Co., N. Y. City.

New aniline-sulfonic acids. No. 1,947,837. Fischer, Kissling & Kracker, to Gen. Anil. W'ks, N. Y. City.

Blue alkoxy-2-hydroxynaphthalene-3-carboxylic acid dyes. No. 1,947,819. Zitscher, Mildner & Luce, Germany, to Gen. Anil. W'ks, N. Y. City.

Indigoid vat dyestuffs, wide color range. No. 1,947,655. J. Muller & R. Stocker, to Ste. Chem. Ind., Basel, Sw.

Production of phenol, cresols and benzol-hydrocarbons from crude tar phenols. No. 1,947,648. F. Hoffmann & K. Lang, to Huttenmannischer Verein, Gleiwutz, Germany.

Neutral resinous reaction product of a diolefine and an alkyl benzene. No. 1,947,626. C. A. Thomas, to Dayton Synthetic Chemical Co., Chem., Inc., Dayton, Ohio.

Azo dye, free from sulfonic or carboxylic acid groups. No. 1,947,550. E. F. Hitch, to du Pont Co., Wilmington, Del.

Dibenzanthrone vat dyestuffs. No. 1,947,047. E. T. Howell, to du Pont Co., Wilmington, Del.

Azo dyes. Nos. 1,947,027-8. H. E. Woodward, to du Pont Co., Wilmington, Del.

Chromiferous azo-dyestuff. No. 1,946,951. F. Straub & H. Schneider, to Soc. Chem. Ind., Basel, Sw.

The making of 1-iodo-8-hydroxy-naphthalenesulfonic acids. No. 1,946,950. A. Stoll & W. Kussmaul, to Sandox Chem. W'ks, Basel, Sw.

Benzanthrone-bz-1-aldehyde yellow dyes. No. 1,946,829. Otto Bayer, Frankfort, to Gen. Anil. W'ks, N. Y. City.

Fast Bordeaux to violet-blue azo dyestuffs. No. 1,951,815. K. Zahn & K. Schimmelschmidt, Ger. to Gen. Anil, W'ks, N. Y. City.

Chromium compound of azo dyestuffs. No. 1,951,830. H. Krzikalla, Mannheim, to Gen. Anil. W'ks., N. Y. City.

Alkyl-2-hydroxynaphthalene-3-carboxylic acids. No. 1,951,832. W. Luce & E. Fischer, Ger., to Gen. Anil. W'ks, N. Y. City.

Step in sulfuration of a para-aminophenol dyestuff. No. 1,952,029. G. Kalischer & H. Ritter, Ger., to Gen. Anil. W'ks., N. Y. City.

Naphthoylene-diarylimidazoles dyestuff. No. 1,952,661. W. Eckert & O. Braunsdorf, Ger., to Gen. Anil. W'ks, N. Y. City.

Dibenzopyrene-quinone vat dyestuffs. No. 1,952,677. Kunz & Koeberle, to Gen. Anil. W'ks, N. Y. City.

Anthraquinone condensation products. No. 1,952,678. Kunz & Koeberle, Ger., to Gen. Anil. W'ks, N. Y. City.

Monocarboxylic acids and their derivatives. Nos. 1,953,231-2. A. O. Jaeger, to Selden Co., Pittsburgh, Pa.

Coloring matter from bases and phenolic bodies. No. 1,953,309. R. B. Payne, to Nat. Anil. & Chem. Co., N. Y. City.

Chlorinated dibenzanthrones, blue. No. 1,953,415. Kunz, Koeberle & Berthold, to Gen. Anil. W'ks, N. Y. City.

Diazo dyestuffs, brown. No. 1,953,512. A. Sieglitz & K. Stenger, to Gen. Anil. W'ks, N. Y. City.

Fluoride-soap-sulfur dye. No. 1,953,909. Draves, Lubs & Walker, to du Pont Co., Del.

Purification of phthalic anhydride. No. 1,953,937. A. O. Jaeger, to Selden Res. & Eng. Corp., Pitts.

Conversion of high-boiling coal tar acids. No. 1,954,091. J. C. Morrell, to Universal Oil Prod. Co., Chicago.

Ungreenable aniline black. No. 1,955,235. A. Holtmann & M. Freiberger, Charlottenburg, Ger.

Patents—Fine Chemicals

Colloidal suspensions from quinine-cinchona alkaloids. No. 1,951,664. E. H. Land, Wellesley Farms, Mass.

Compositions, alkyl salicylate and an alkali-metastearate. No. 1,951,737. F. W. Nitardy, to E. R. Squibb & Sons, N. Y.

Mineral acid esters of glucosides. No. 1,951,785. H. Bertsch, to H. T. Bohme A-G., Chemnitz, Germany.

Phenalkyl-keto-dihydro-benzoxazines. No. 1,951,807. E. Preiswerk & H. Mayer, Sw., to Hoffman-La Roche Inc., Nutley, N. J.

Mercury derivatives of di-phenyl phenolphthalein. No. 1,952,166. S. E. Harris & W. G. Christiansen, to E. R. Squibb & Sons, N. Y. City.

For 1-phenyl 3, 4-di-hydroxy benzene. No. 1,952,755. A. W. Harvey, to E. R. Squibb & Sons, N. Y.

Mercury compounds of nitro-ortho-cresols. No. 1,953,263. G. W. Raiziss, to Abbott Labs., North, Chicago.

Preparation of gluconic acid. No. 1,953,694. T. Takahashi, Tokyo.

Anaesthetic. No. 1,954,152. Streitwolf, Fehrle, Herrmann & Fritzsche, Ger., to Winthrop Chem. Co., N. Y.

Superimposed silver halide gelatin layers. No. 1,954,294. G. Heyner, to Agfa Ansco Corp., Binghamton, N. Y.

Cell. acetate with cyclo-hexanone and ortho cresyl para-toluene sulfonate. No. 1,954,326. T. F. Murray & C. J. Staud, to Eastman Kodak Co., Rochester, N. Y.

Pigmented paper of catalytic effect upon autoxidation of material. No. 1,954,333. S. E. Sheppard & H. J. Dietz, to Eastman Kodak Co., Rochester, N. Y.

Cell. derivative solvent. No. 1,954,336. C. J. Staud & C. S. Webber, to Eastman Kodak Co., Rochester, N. Y.

Thio-pyrazalone as fog-inhibiting agent for photographic emulsions. No. 1,954,334. S. E. Sheppard & W. Vanselow, to Eastman Kodak Co., Rochester, N. Y.

Sensitive coating of water-insoluble cell. acetate phthalate with coloring matter. No. 1,954,337. C. J. Staud, to Eastman Kodak Co., Rochester, N. Y.

Optically active isomers of mono-hydroxyphenyl methyl-amino-ethanols. No. 1,954,389. H. Legerlotz to Frederick Stearns & Co., Detroit.

Barbituric compound, propyl-methyl. No. 1,954,429. H. A. Shonle, to E. Lilly & Co., Indpls.

Ephedrine ethyl mercuri-thiosalicylate. No. 1,954,432. E. H. Stuart, to E. Lilly & Co., Indpls.

Treatment of photographic emulsions. No. 1,954,512. D. K. Allison, to Chem. & Res. Corp., Cal.

For making hydrous dextrose. No. 1,954,584. C. J. Copland & W. B. Newkirk, to Int. Patents Dev. Co., Wilmington.

Antimony derivative of sulfarsphenamine. No. 1,954,615. W. G. Christiansen & A. E. Jurist, to E. R. Squibb & Sons, Brooklyn.

Mercurated isatin derivatives. No. 1,954,619. W. G. Christiansen & S. E. Harris, to E. R. Squibb & Sons, Brooklyn.

Medicinal of magnesium and wood-tar phenol. No. 1,954,766. R. P. Fischelis, to Maltbie Chem. Co., Newark, N. J.

Silicate contacting to lower proportion of C and phosphate ions in liquid milk. No. 1,954,769. J. F. Lyman, to M & R Dietetic Labs., Columbus, O.

Trade-mark "Funginox". Corrosive sublimate and hydrochloric acid vegetable protectant. No. 347,863. Mallinckrodt Chem. W'ks, St. Louis.

Trade-mark "Dextrosol." Crystallized dextrose, medicinal. No. 348,016. Corn Prod. Ref. Co., N. Y.

For double compounds of salts of phenylquinoline carboxylic acids. No. 1,954,909. O. and R. Adler, Karlsbad, Czechoslovakia.

Purifying ricinoleic acid. No. 1,955,021. T. H. Rider, to W. S. Merrell Co., Cinci.

Process for benzoic acid. No. 1,955,050. J. Brode & A. Johannsen, to I. G. F., Frankfort.

Halogen-benzanthrone process. No. 1,955,135. M. A. Kunz & K. Koeberle, to Gen. Anil. W'ks, N. Y.

Colloidal solutions of inorganic substances. No. 1,955,211. C. H. von Hoessle, to Heyden Firm, Radebeul, Ger.

Plant Equipment

Where Silver Solves Corrosion Problems

Silver may be used, after taking consideration of possible price limitations, in most industries where corrosion takes place owing to attack on base metal plant by the acids involved. Silver is attacked by nitric and hot sulfuric acids, but its resistance to the organic acids makes it especially suitable for food manufacture where corrosion has the additional effect of food contamination. Among the food products for which silver plant is advantageous are jams, pickles, vinegar, essences and cider. Other plants for which silver is in demand includes that used for acetic acid, scent, photographic, emulsions aniline dyes, general chemical production and ink filling.

In vinegar and acetic acid plants, condensing coils and stills are used, and these being made of pure silver, no idea of the cost can be given without the makers having accurate drawings of the parts required. Pure silver is highly recommended for use in the distillation of white vinegar, where copper has been found to cause discoloration.

Plants making scents, essences, photographic emulsions, aniline dyes and general chemicals find that pure silver apparatus is usually best adapted to their requirements, but occasionally copper and nickel pans or troughs are lined with the metal. Silver-lined or silver-covered copper condensing coils can be made, but some difficulty is experienced in making the joints, and it is sometimes more economical to use solid silver.

Ordinary ink has a very corrosive action on base metal with which it comes in contact, and silver has been found to give good results when used to line many of the essential parts of machines for filling ink-bottles. Bottling machinery also suffers attack from cider, and silver should be applicable in this case, although up to the present it has not been used.

Silver plating by electro-deposition can be used in most of the cases mentioned, but owing to the porosity of the plated surface, it is only a short time until chemical attack occurs and repairs are necessary, with consequent interruption of production. It is, therefore, more satisfactory, where corrosion-resisting properties of silver are desired, to use pure silver sheet, attached to the surface of the base metal plant. *Canadian Chemistry and Metallurgy*, March, '34, p. 65.

Plant Operations

A Study In Crushing

Under free crushing conditions, whether the load is applied by simple crushing, shear or impact, it has been found that homogeneous brittle solids break down with a constant fracture pattern, which is independent of the size of the original specimen. It appears that the minimum work required to crush a powder depends on the product of (1) the constant for the material, (2) the weight of the material crushed, and (3) the logarithm of the total mean reduction (the mean original size divided by the mean final size).

To crush coal and anhydrite through a 10:1 reduction ratio it has been found to involve an energy consumption of 0.05 and 0.15 K.W.H/T. respectively. Material of ½ in. size crushed to 200 mesh involves a mean reduction ratio of about 100:1, and the work necessary is thus 0.1 K.W.H/T. for coal and 0.3 K.W.H/T. for anhydrite. Values of a similar order have been obtained for other materials, and indicate that industrial crushing requires about 100 times as much energy as that theoretically necessary. This means that the industrial methods of crushing are very wasteful in energy compared with the process adopted by a laborer crushing stones. Industrially, this information is perhaps of little value, but it gives a basis on which to define the efficiency of other grinding processes in which the loading conditions of the individual particles are difficult to define. W. F. Carey, Imperial Chemical Industries research staff, before British Society of Glass Technology.

Thermal Expansion of Silica Brick

A large number of thermal expansion runs made on a silica brick during the course of firing has shown that the expansion up to 1000° is not truly reversible, an appreciable permanent expansion occurs. Repetition of measurements on the same specimen over the same range shows a decrease in expansion approximately equal to the permanent expansion registered in the first run. A further but smaller permanent expansion remains in the 2nd run. These effects were not due to phase changes in the quartz, but to the agglomerate nature of the brick. It is suggested that experiments conducted to investigate the influence, if any, of the chemical composition of the bond upon the expansion would yield interesting results. Dr. J. A. Sugden, Imperial Chemical Industries' research staff, before British Society of Glass Technology.

Information on "Silicosis"

In view of the increasing prominence given to effects of silica dust on the health of workers, the Industrial Health Section of the Metropolitan Life Insurance Co. has prepared a booklet entitled "Silicosis" for the information of plant superintendents and foremen in departments where silica dust is present. Booklet might be of aid in controlling dusty processes arising in the course of manufacture. A limited number of copies of the booklet are available for readers of this publication. Requests may be addressed direct to the Industrial Health Section, Metropolitan Life Insurance Co., One Madison ave., N. Y. City.

New Method For Testing Oilcakes

Present methods of testing oilcakes, especially for oil content, are often unsatisfactory. Main grounds—the sampling methods. Various improvements in these methods have been recently suggested, both in Germany and Russia. It is a matter of common experience that the oil content of cakes varies under the influence of several factors, such as position in store, kind of press and method used, length of time in storage, etc. Again, oil content varies in different parts of the same cake, more particularly those of rectangular shape: sometimes it is greater at the edges than in the middle, and sometimes it is less. According to Ubbelohde's "Handbuch" (1932 edit. Vol. 2, page 765), samples should be taken by collecting the meal formed by a saw-cut parallel to the sides of the cake. In a report published 2 or 3 years ago by the North Caucasian Oil and Fat Trust, A. Ruschenzoff gave full details of the latest Russian method. Cakes are divided into 5 or 6 equal strips or zones, and from several holes bored at equal distances in each strip meal is collected, also from the edges. A certain amount of difference was found between square and oblong cakes in respect to variation in oil content as between centre and edges, partly owing to the fact that square cakes are not cut and there is a certain thickening of the edges with slightly higher percentage of oil. Further details of

Ruschenzoff's method are given in *Seifens Zeit.* ('33, p. 807-7 and 828), by R. Heublum, who has himself tried it, and found it more satisfactory than that usually adopted.—*Chemical Trade Journal* (British), Jan. 12, '34.

Research at Mellon in '33

Throughout the last fiscal year 66 industrial fellowships—15 multiple and 51 individual fellowships—have been at work at Mellon Institute. These different investigations have required the services of 101 fellows and 34 assistants during all or part of the year. At the close of the year 55 industrial fellowships—14 multiple and 41 individual fellowships—were in operation and 79 fellows and 25 assistants held positions thereon. Twenty-six fellowships have been working for 5 years or more, and of this number 14 have concluded 10 years of research, 8 have been active for 15 years or more, and 3 fellowships are 20 years of age or older. In 1932-33 the number of fellowships was 67, and at the end of that year 55 fellowships—the same number as at the close of the past year—were operating. In 1932-33 the fellowship staff members totalled 137; in 1933-34, 135. At the end of the year 1932-33 there were 98 fellows and assistants, but at the close of 1933-34 the number was 104. These data show that the research of the Institute has not diminished appreciably in amount nor in variety during 1933-34 and that this investigational work has recently been increasing in extent. Eleven fellowships began operation during the year 1933-34: Cosmetics; Nitrogen Compounds; Calgonizing; Rayon; New Plastics; Vanadium; Phosphates; Food Merchandising; Tar Acids; Ceramic Chemicals; and Textile Finishing.

Fellowship on Nitrogen Compounds is investigating chemical composition and recoverable constituents of by-product coking waste liquors. Calgonizing Fellowship is studying the properties and utility of sodium metaphosphate ("Calgon"), especially from the standpoints of textile chemistry and laundry technology. Fellowship on Phosphates is concerned with the pharmacology and therapeutic value of the same chemical. The Food Merchandising Fellowship is now carrying on research relating to the preservation and keepability of vegetables, particularly the maintenance of their freshness and quality in retail establishments. The Fellowship on Ceramic Chemicals is engaged in studies on the production and use of frit for ferrous enameling. Following fellowships concluded their investigational programs during the year: Insulating Glass; Carbonated Beverage; Wood By-products; Gluconic Acid; Safety Glass; Graphite; Portland Cement; Packaging; Coke; Cast Iron; and Oral Hygiene.

The multiple fellowship of the Carbide and Carbon Chemicals Corporation, E. W. Reid, senior fellow, has devoted a large portion of its time to the investigation of industrial applications of the newer types of solvents. It has also developed several new plasticizers that are suitable for cellulose acetate and cellulose nitrate. These plasticisers, which are of the glycol ether-ester type, show exceptionally good solvent power for cellulose esters and are quite stable to light and heat; at present they are undergoing large-scale tests in actual use and will probably be marketed on a limited scale this year.

Considerable research has been carried out on textile lubricants and a water-soluble product has been found that is useful for the lubrication of worsteds and wool. This lubricant is quite high-boiling, and has the desired lubricating properties on the fiber and sufficient tack to prevent excessive draft on the machines. It is entirely miscible with water—a characteristic that eliminates scouring before dyeing, resulting in considerable economy in its use—and it gives a yarn that is white and soft, with a lofty handle. While a lubricant of this type must necessarily sell for a higher price than the present oils, plant tests have demonstrated economies to the textile manufacturer.

A number of very promising new-type amines have been synthesized during the past year, and some of the straight-chain amines, such as diethylene triamine and triethylene tetramine, will be introduced commercially during the coming year. A series of amines of the morpholine type have also been found to offer exceptional promise as emulsifiers and inhibitors, and in the synthesis of pharmaceuticals and other chemicals of this type.

The research work on resins has been continued and several new types have been found that may offer some promise for special industrial applications. These products are now only in the laboratory stage, but appear to possess unique properties.

Equipment Booklets

A monthly digest of the literature prepared by manufacturers of heavy equipment, containers, and packaging equipment.

E125. Anchor Cap & Closure Corp., 22 Queens st., L. I. City. A 4-page leaflet describes in detail many advantages of the Anchor Amerseal Cap.

E126. The Brown Instrument Co., Philadelphia, Pa. Company has just issued a 32-page catalog, featuring the Brown Resistance Thermometer for measuring temperatures from −300 degrees to +1000 degrees, Fahr. Booklet describes in great detail such improved features as: universal case; electric chart drive; combination door handle and lock; toggle switch for chart drive, etc.

E127. Commonwealth Electric & Manufacturing Co., 83 Boston st., Boston. New Bulletin No. 52A discusses new miniature electric-heated steam generators (boilers) in smaller capacities ranging from 2 to 18 kilowatts, equivalent to 6 to 54 lbs. of steam by weight generated per hour.

E128. Farrel-Birmingham Co., Ansonia, Conn. "The Job Ahead for Machinery" is one of the clearest discussions of the subject of technological unemployment yet to be made in such a short space, and effectively sticks a good-sized pin in the theories about machinery causing and prolonging the depression. Copies were mailed to over 2,000 executives throughout the country and should be read by those in the equipment field and in the manufacturing and process industries.

E129. J. L. Ferguson Co., Joliet, Ill. *Packomatic* for April is devoted largely to a report on the installation of Packomatic machinery units at the Old Quaker Co.'s liquor plant at Lawrenceburg, Ind., and to various sidelights of the recent Packaging Show in N. Y. City.

E130. Fulton Sylphon Co., Knoxville, Tenn. New loose-leaf booklet describes in detail special features of Sylphon pressure regulators.

E131. The Horsburgh & Scott Co., 5114 Hamilton ave., Cleveland. A new 448-page booklet on gears. Unique are: Complete lists of all types of gears, giving catalog numbers and prices. Nearly all numbers of teeth are included. Both circular pitch and diametral pitch spur gears are listed: 108 pages of the latest gear engineering, horsepower ratings and tooth loads for each gear listed; the most comprehensive hob list yet published; complete speed reducer engineering section and speed reducer data.

E132. The Kron Co., Bridgeport, Conn. A new condensed catalog (No. 7) describes briefly the Kron complete line of industrial dial scales.

E133. LaMotte Chemical Products Co., New 2-page leaflet studies the "Significance of Periodic Soil Tests" and describes LaMotte Combination soil testing outfits.

E134. The Linde Air Products Co., 30 E. 42 st., N. Y. City. *Oxy-Acetylene Tips* for April features a splendid article on "Building and Industrial Pipe Welding Practices."

E135. Link-Belt Co., 810 S. Michigan ave., Chicago. A new general catalog of 1,024 pages. In the Foreword, book is referred to as a Handbook of Practical Information on Link-Belt Cost-Reducing Machinery—for the mechanical conveying and preparation of materials, and the transmission of power. It shows such of the company's products as can be purchased on a list and discount basis, gives engineering and dimensional data, and should prove useful to the designing engineer and buyer alike. Among the equipment covered are elevating and conveying chains, elevator buckets, sprocket wheels, chain drives, power transmission machinery, positive variable speed transmission units, standardized bucket elevators, apron conveyors, screw conveyors, belt conveyors, bucket elevators and conveyors, flight conveyors, car dumpers, sand and gravel plant equipment, coal and ashes handling machinery, etc.

E136. Littleford Bros., 447 E. Pearl st., Cincinnati. A 4-page circular shows some of the recent plate steel fabricating jobs done by this company.

E137. Orville Simpson Co., 1230 Knowlton st., Cincinnati. Catalog 83 describes in detail Rotex screeners designed for special jobs. Particularly fine illustrations enhance greatly the value of this publication to the works manager investigating or troubled with a screening problem.

E138. The Patterson Foundry & Machine Co., East Liverpool, Ohio. New 4-page leaflet indicates advantages of Porox acid resistant lining blocks and cement for old and new processing equipment.

E139. Premier Mill Corp., Geneva, N. Y. A new 15-page booklet, illustrated profusely, discusses the various Premier Colloid Mills and their unusual and patented features.

E140. Pulmosan Safety Equipment Corp., 176 Johnson st., Brooklyn. A new leaflet illustrates various types of safety goggles.

E141. Parker Rust-Proofing Co., Detroit. Company is distributing copies of "A Common Cause of Paint Failure and its Scientific Prevention" written by R. R. Tanner, president, Metal Finishing Research Corp. Paper's purpose is to inform fabricators of iron and steel articles about the development of alkali as a result of electro-chemical activity on iron or steel and the prevention of rust.

E142. Quigley Co., 56 W. 45th st., N. Y. City. Bull. No. 306 describes Q-Chrome and its use for furnace construction and maintenance.

E143. The W. W. Sly Mfg. Co., 4700 Train ave., Cleveland. Company has just issued a new and more up-to-date bulletin on the Sly Purair helmet unit.

E144. Surface Combustion Co., Toledo. Latest monthly bulletin deals with SC controlled atmospheric furnaces for bright annealing steel stampings.

E145. Worthington Pump & Machinery Corp., Harrison, N. J. New 6-page booklet (L-611-S9) describes Worthington Refrigeration compressors.

E146. Worthington Pump & Machinery Corp., Harrison, N. J. "Compressed Air at Lower Cost" is the title of a new 4-page leaflet.

E147. U. S. Stoneware Co., 50 Church st., N. Y. City. Bull. 701 describes "U. S. Standard" Armoured centrifugal acid pumps (chemical stoneware lined); specifications are given; also a long list of chemicals for which its equipment is specifically recommended.

Chemical Industries,
25 Spruce Street,
New York City.

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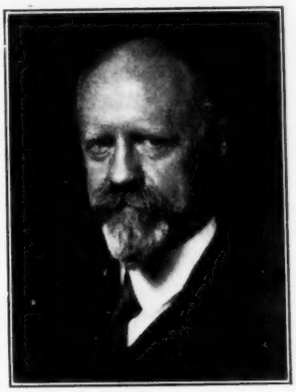
PQ EST. 1831

Chemical Markets & News

Prominent Chemical Leaders in Group of Industrialists Protesting Against Stock Exchange Regulation Bill

Twenty-four hours before transfer to the Senate floor of the battle over the stock exchange regulation bill 28 industrial leaders appealed May 6 for modification of the measure to exempt business from its scope.

As head of a special committee affiliated with the National Association of Manufacturers, William B. Bell, president of Cyanamid, led the attack on the bill, declaring that it threatened "strangling regulation" of 450,000 firms "with no Wall Street connection." He announced the dispatch to every member of Congress of a letter signed by the business executives associated in his committee, protesting the reports which would be required of corporations under the stock market bill.



William B. Bell, Cyanamid president, who drafted letter requesting modification

In addition to the "unbearable financial burden" which would be imposed upon smaller concerns, the regulatory provisions of the bill applicable to business, the letter said, would "set up a barrier to the free flow of private capital into industrial enterprises, so essential to re-employment of labor and to the furnishing of capital for immediate recovery."

In making public the letter of the industrialists, who are associated in the National Committee for the Modification of Industrial Sections of the Securities Exchange Bill, Mr. Bell said:

"This group of representative industrialists has been organized to demand for business the justice which is not now a part of the pending stock exchange regulation bills. It will endeavor to awaken every business man to the fact, apparently little realized, that while ostensibly this legislation is intended only to eliminate recognized speculative abuses from the security exchanges, actually more than 450,000 firms throughout the land with no Wall Street connection would be brought under the strangling regulation of a Federal bureau.

"This legislation assumes that in order to obtain the purging of the stock markets, with which industry is in sympathy, it is necessary to require numerous reports from all of these thousands of small corporations that have no connection whatsoever with the stock market. The additional bookkeeping and accounting which would be necessary to meet the requirements of Federal regulation would place an unbearable financial burden upon many of the small corporations."

The letter criticized specifically sections of the bill dealing with registration requirements for securities, regulation of practices with regard to corporation proxies, administration of over-the-counter security transactions, extension of liability provisions to principal stockholders, publicity of corporation information and penalty provisions.

Among other consequences these provisions placed heavy expenses on business, tended to discourage large investments in stocks and permitted Federal interference in the conduct of business corporations, the letter said.

The letter, addressed to Duncan U. Fletcher, chairman of the Senate Committee on Banking and Currency, and Sam. Rayburn, chairman of the House Committee on Interstate and Foreign Commerce, suggested a number of specific modifications in the measure.

Industry Well Represented

Chemical industry was specially well represented in the group of executives signing the letter: Edgar M. Queeny, Monsanto president; H. S. Wherrett, president, Pittsburgh Plate Glass; Theodore Swann, president, Swann Corp.; E. M. Allen, president, Mathieson Alkali; Daniel Peterkin, president, Morton Salt; and Sewell Avery, president, U. S. Gypsum.

N. F. A. Quotes Statistics

A year ago farm prices at the farm were only 49% and fertilizer prices at the factory were 71% of pre-war, according to the N. F. A. However, for all commodities purchased farmers were paying almost exactly pre-war prices. On the average, the farmer's dollar was worth only 50c, whereas when spent for fertilizer it was worth 71c.

Now farm prices are 70% of the pre-war average, fertilizer prices are 81%, and all commodities that farmers buy are 116% of pre-war. The farmer's dollar is now worth, on the average, 60c, but when spent for fertilizer it is worth 86c. From these comparisons it will be seen that, *relatively*, fertilizers are considerably cheaper this year than last.

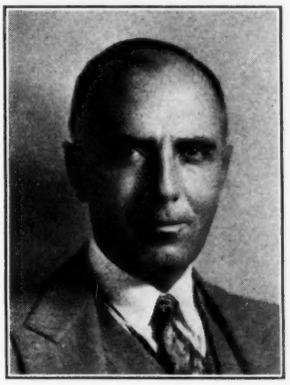
Reports from many localities indicate that farmers are complaining about the alleged high prices of fertilizers this spring. It is true that fertilizer prices are somewhat higher than last year, but there are good and sufficient reasons for the increase. One manufacturer who has always figured his costs with great accuracy has stated recently that the present cost of making a ton of average fertilizer is $2.42 greater than last year. This is due to the increased costs of materials, bags, and labor. A very recent study of cost figures submitted by a number of companies shows that the cost of making a good potato fertilizer is now 23% greater than a year ago.

Price-Cutting

Another very important consideration is the fact that during the past 3 years there has been a great deal of price cutting and as a result much fertilizer was sold at less than the cost of production. In some cases it was even sold at less than the cost of the material that went into it. Wages were reduced to exceedingly low levels, and yet most fertilizer companies lost money during those 3 years.

Against Tariff Measure

Chemical industry was represented before the Senate Finance Committee in its hearings on the proposed reciprocal tariff measure (H. R. 8687) by Harry L. Derby, president, American Cyanamid & Chemical. Mr. Derby, speaking as the spokesman of the Manufacturing Chemists' Association stated: "We do not believe that



Noted tariff authority who represented chemical industry before the Senate Finance Committee

the making of the tariff, which this bill contemplates, should fail to have the supervision of the Senate."

Mr. Derby, recognized both in and out of the chemical field as an outstanding authority on tariff matters, pointed out to the Senate Committee that ever since the tariff was imposed the Senate and the House have participated in schedule making. "We believe" stated Mr. Derby, "that the membership of those two bodies has peculiar knowledge of the industries and agriculture and labor in their respective districts and that those representatives can more properly safeguard those interests than otherwise."

Mr. Derby's position before the Committee was unchanged from that taken by him early in '33 (Chemical Markets, April, '33, p. 337). At that time he stated: "While we have at the moment in the White House a man of high integrity, a man in whom the people have complete confidence in his fairness and disinterestedness, what assurances have we that this will always be so? Why change to a new untried revolutionary policy when we have ample facilities in the present Tariff Commission and the flexible clauses of the present tariff measure to correct any unreal unfairness in the rate structure." And before the Senate Committee last month Mr. Derby summarized the position of the chemical industry as follows: "We have every confidence in the President. We have no doubt whatever of his good intent, and it is the desire of our industry to cooperate 100% with him. There are said to be 6,000 odd items in the tariff schedule. It is not physically or mentally possible for any man, as busy as he, to know all the background of all those commodities. Therefore, he must rely on some group of men to determine what it is safe to trade and what it is unsafe to trade. We don't believe that any group of men can safely advise the President unless they are fully informed by those that are directly affected as to what the result might be."

Labor Trouble

With less than 12 hours notice a group of employes at National Aniline's Buffalo plant went out on strike on March 17 (CHEMICAL INDUSTRIES, April, †34, p. 346). Question in dispute is the refusal of the Company to sign a contract which the Union leaders presented. At no time have wage scales, hours of labor, or working conditions been complained of by employes, but certain of the latter, in conjunction with A. F. of L. representatives, have insisted that a written agreement must be signed defining these conditions. The Company refused to do this.

The dispute was finally referred to the Buffalo Regional Labor Board. On Apr. 10th the Board ruled that: (1) The National Aniline & Chemical Co. and the Aniline Chemical Workers' Local proceed at once to negotiate an agreement and that any agreement reached be reduced to writing; (2) that all disputes arising in the future which are not settled by negotiations between the parties, shall be submitted to the Buffalo Regional Labor Board; (3) that the strikers return to work if and when the Company agrees to comply with Sections 1 & 2 of this ruling. Keith Williams, representative of industry on the Committee, dissented from the ruling.

Appeal to Washington

An appeal was taken to the National Labor Board and at the hearing held in Washington on May 2 Judge Daniel J. Kenefick, counsel for the Company, stated that the position of National Aniline was unchanged from that outlined before the Regional Board. C. F. Conroy, organizer for the A. F. of L., appeared as labor representative.

National Aniline pointed out to the citizens of Buffalo in a page advertisement in the *Buffalo Courier-Express*, Apr. 11 that in the 47 years of the plant's existance no labor trouble of any kind has ever occurred; that the highest wages of any dye company in the world have been consistently paid; that during the depression no general reduction in wages was made; that the Company is constantly complying with the provisions of the Chemical Code; that it has never refused to deal with any committee of its employes; that merit has been the only standard of advancement; and that the Company believes in the "open-shop" principle.

COMING EVENTS

International Petroleum Exposition, Tulsa, Okla., May 12-19.
American Institute of Chemical Engineers, tentative, Waldorf Astoria, N. Y. City, May 14-21.
National Fire Protection Association, Atlantic City, May 14-18.
Porcelain Enamel Institute, 4th annual convention, Hotel Statler, Cleveland, May 16-17.
Achema VII Exhibition of Chemical Apparatus & Plant, Cologne, Germany, May 18-27.
Flavoring Extract Association, Waldorf-Astoria, N. Y. City, May 21-24.
American Institute of Chemists, annual meeting, Chemists' Club, N. Y. City, May 21.
The Proprietary Association annual meeting, Hotel Biltmore, N. Y. City, May 22-24.
American Petroleum Institute, mid-year meeting, Pittsburgh, William Penn Hotel, May 22-24.
American Leather Chemists' Association, 21st annual meeting, Skytop Lodge, Skytop, Pa., May 23-25.
Cottonseed Products Association, New Orleans, Hotel Roosevelt, June 4-5.
Canadian Chemical Association, Royal York Hotel, Toronto, June 4-6.
American Water Works Association, Hotel Commodore, N. Y. City, B. C. Little, secretary, June 4-6.
American Association of Cereal Chemists, Royal York Hotel, Toronto, June 4-7.
Synthetic Organic Chemical Manufacturers' Association, annual outing, Skytop Lodge, Skytop, Pa., June 7-8.
Manufacturing Chemists' Association, 62nd annual meeting, Skytop Lodge, Skytop, Pa., June 7-8.
Ninth International Congress of Pure & Applied Science, Madrid, Spain, June 10-17.
National Association of Insecticide & Disinfectant Mfrs., Inc., Chicago, June 11-12.
National Fertilizer Association, 34th convention, White Sulphur Springs, June 12-14.
American Electroplaters' Society, Hotel Statler, Detroit, June 11-14.
Eleventh Colloid Symposium, Madison, Wis., June 14-16.
N. Y. State Sewage Works Association, Jamestown, N. Y., June 15-16.
National Association of Purchasing Agents, Cleveland, June 18-21.
American Society of Refrigerating Engineers, semi-annual meeting, Skytop, Pa., June 21-22.
A. S. T. M. Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, June 25-29.
Pa. Water Works Operators Association, State College, Pa., June 25-27; also Pa. Sewage Works Association.
Technical Association of the Pulp & Paper Industry, fall meeting, Portland, Ore., Aug. 28-31.
American Public Health Association, Pasadena, Calif., Sept. 3-6. W. R. Walsh, Secretary, 450 7 ave., N. Y. City.
American Trade Association Executives, Wernersville, Pa., Sept. 9.
A. C. S., 88th meeting, Cleveland, Sept. 10-14.
American Gas Association Convention and Exhibition, Atlantic City, Week of Oct. 29.
National Paint, Varnish & Lacquer Association, Annual Convention, Washington, fall of the year, date to be announced.

LOCAL

Electrochemical Society, N. Y. Section, May 18, Chemists' Club.
Joint Meeting, N. Y. Sections, 4 technical societies, May 25, Chemists' Club, A. C. S. in charge.

Secretaries of Chemical Associations and Groups allied to chemistry are urged to make use of this column.

Obituaries

Forest Shattuck, 65, died Apr. 11, at Beverly Hills, California, where he had resided since his retirement. A graduate of the Boston Institute of Technology in the Class of '91, he became associated with the Solvay Process, at Syracuse, and later transferred to that Company's Detroit factory as chief chemist. He remained there until 1914, moving to California on account of ill health. He looked after Solvay interests at Boro Solvay at Searles Lake, Calif., retiring in 1919. He organized the 1st Chemical Society of Detroit, but owing to his poor health was compelled to forego acceptance of the presidency of that organization.

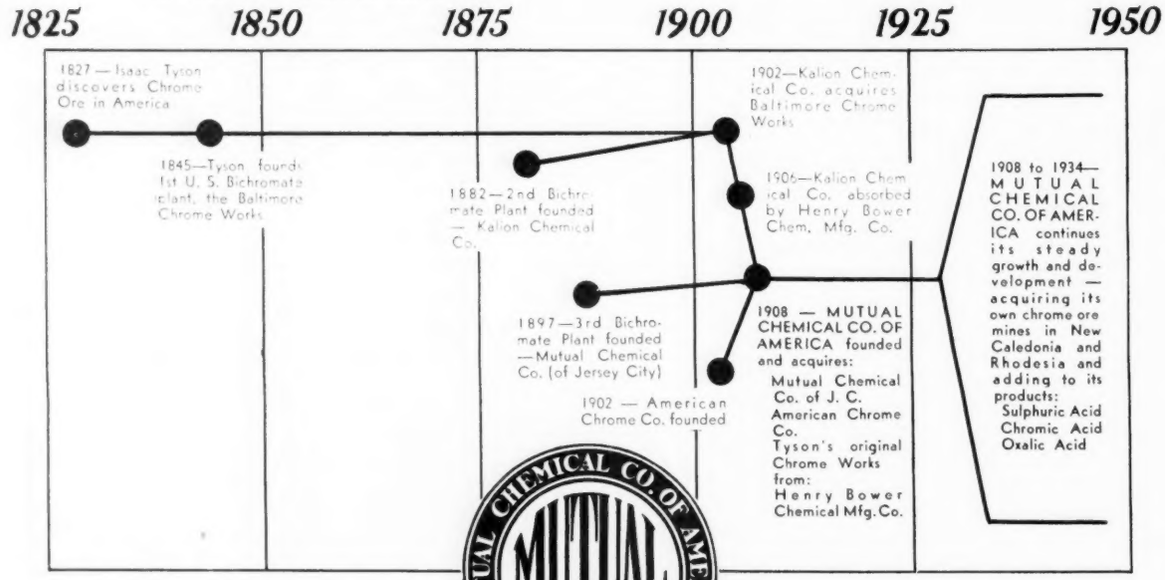
A Modern Idea
over 100 years Old

In 1827 Isaac Tyson recognized as Chrome Ore two heavy black stones he saw supporting a barrel on a Baltimore market dray. He traced the stones to their source, discovered a sizeable ore deposit, acquired the properties and through mining them, took the first step in the founding of a new industry in this country. For a number of years, the Ore was shipped to Europe for processing.

In 1845 he organized the Baltimore Chrome Works and built the first Bichromate plant in the new world.

The Mutual Chemical Co. of America has continued and developed Tyson's first venture, and one of their present plants,—the largest in the country,—occupies the site of Tyson's original Chrome Works in Baltimore.

The Mutual Chemical Co. or its antecedents have been intimately associated with every step in the development of Bichromate since Tyson's discerning eye discovered the presence of Chrome Ore in this country.



Bichromate of Soda
Chromic Acid

MUTUAL CHEMICAL CO. OF AMERICA
MUTUAL
NEW YORK, N.Y.

Bichromate of Potash
Oxalic Acid

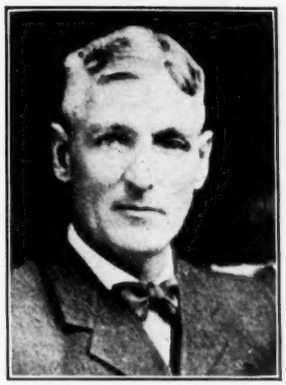
FACTORIES
Baltimore Jersey City

MINES
New Caledonia South Africa

The History of Mutual is the Chemical History of Chrome in America

William C. Procter

William Cooper Procter, 72, chairman of the board of the Procter & Gamble Co., died May 2 of bronchial pneumonia.



In 1930 he resigned as president, giving active management of the company over to other officials. He was internationally known for his progressive policies toward labor and for his philanthropies.

John C. Robinson

John C. Robinson, affectionally known as "Uncle John", and associated with Merck for nearly 50 years, passed away April 25 at his home in Dallas, Texas. He has been in retirement since '27.

E. V. Benjamin

E. V. Benjamin, 66, president, Bay Chemical, also Myles Salt, died at his home in New Orleans May 1, after an illness of several weeks.

Other Deaths

Col. H. A. Molony, president, Molony & Carter, Charleston fertilizer dealers, died Apr. 13. . . George McClintock, secretary, MacLac-Kasebier-Chatfield, died Apr. 27. He was technical director of the Rahway plant. . . Sir Max Muspratt, 62, prominent in British alkali circles for many years and a director of I. C. I. since the incorporation of United Alkali with the former, died April 20. . . Sinclair Smith, 76, president, J. Lee Smith & Co., N. Y. City importer of earth colors, died Apr. 12. . . J. D. Rockafellow, Harshaw Chemical representative in Dallas, died Apr. 6. . . Dr. David E. Reid, 59, director of the Eastman Kodak industrial chemical laboratories, died Apr. 15. . . Richard V. Look, 59, vice-president and a director, Dominion Tar & Chemical, died Apr. 18. . . Prof. Camille Matignon, 67, president of the French Chemical Society, died Mar. 30.

For Chemical "P. A.'s"

Brookmire Commodity Bulletin suggests that passage of the Bankhead Bill by the House of Representatives strengthens the possibility of higher cottonseed oil prices.* Same analysis states: "We have previously advised clients to contract for the year's requirements of most chemicals. We continue to give this advice." Report also now favors covering naval stores requirements through July.

*Bill was also passed by the Senate and signed by the President last month.

Foreign

German Foreign Trade

Of possible significance in German foreign trade in chemicals and allied products was the improvement in 14 major items, which accounted for more than half of the total value of chemical imports into Germany in '33, all items being materials for industrial use. Imports of all chemicals and allied products, as compared with '32, increased 23% in quantities to a total of 2,611,800 metric tons, but declined 1% in values to 226,914,000 marks ($53,847,000). Exports dropped 5 and 6%, respectively, to 2,381,200 metric tons valued at 682,767,000 marks ($162,021,000). U. S. continued its relative position as a source of supply. Leading import items, with '33 figures, are shown:

Principal Imports, 1933	*Quantity (metric tons)*	*Value (1,000 marks)*
Rosin	60,599	8,897
Fishmeal for fodder and fertilizer	100,841	15,115
Animal fertilizer	28,851	4,613
Tung oil	6,474	3,400
Phosphate rock	688,228	15,045
Sulfuric acid and anhydride	203,081	6,047
Bleaching materials	2,034	2,036
Miscellaneous chemical compounds	8,212	6,504
Carbon black	8,368	2,868
Turpentine	23,554	9,428
Essential oils and menthol	1,138	5,836
Basic slag	1,012,530	32,270
Casein and similar products	16,432	5,649

Exports

Export trade is somewhat less concentrated, though 50 items accounted for around three-fourths of the total value. Coal tar dyes continued to hold 1st place in exports and represented one-fifth of the total value, or 133,738,000 marks ($31,130,000) and 26,818 metric tons. Exports of potash fertilizers totaled 753,800 tons valued at 50,000,000 marks ($11,865,500); and of medical preparations, 4,875 tons at 89,964,000 marks ($21,350,000).

Exports that registered outstanding increases are shown below:

	Metric tons
Ammonium sulfate	454,621
Sulfur	29,468
Caustic potash	32,199
Calcium nitrate	8,009
Chromic acid and potassium chromate and chromium oxide	3,144
Formic acid and salts	6,427
Zinc oxide	9,312
Lithopone	13,053
Iron oxide (not for retail sale)	9,648
Lead, zinc, and iron pigments ground in oil	3,646
Lacquers and varnishes, nonalcoholic	6,740
Nitrogen fertilizers, n.e.s.	28,626
Gelatine	1,174

Exports of sodium nitrate showed the largest decline, from 157,822 metric tons in '32 to 28,719 tons in '33. Cyanide exports were cut in 2; sodium sulfate fell from 160,411 to 131,374 tons; and coal tar pitch from 129,816 to 67,268 tons.

Although complete data are not yet available, approximately two-thirds of the chemical exports were destined for 18 countries, some countries were points of trans-shipment. Netherlands held 1st place, with 428,227 metric tons (valued at 54,412,000 marks); U. S. 2nd, with 315,065 tons (530,073,000 marks); Belgium, 145,357 tons (25,527,000 marks); U. K., 154,774 tons (48,220,000 marks); France, 85,576 tons (23,398,000 marks); Switzerland, 75,853 tons (34,573,000 marks); Japan, 151,124 tons (24,996,000 marks); Argentina, 14,558 tons (12,995,000 marks); Brazil, 19,832 tons (17,626,000 marks); and other Latin American countries, 16,392 tons (25,026,000 marks).

Helping Trade

Willingness of Germany's foreign bondholders to accept cash settlements at discounts ranging up to 25% has been of great assistance to the countries' chemical exporters who have accepted them in payment at face value, according to C. C. Concannon, chief, chemical division, Bureau of Foreign and Domestic Commerce. That this fact is largely responsible for the remarkably fine showing made by Germany's chemical exporters in recent years is borne out by a report from Consul Sydney B. Redecker, Frankfort-on-Main. Report points out that despite the fact that Germany is nominally on the gold standard, it has been able to compete with countries where exchange is greatly depreciated.

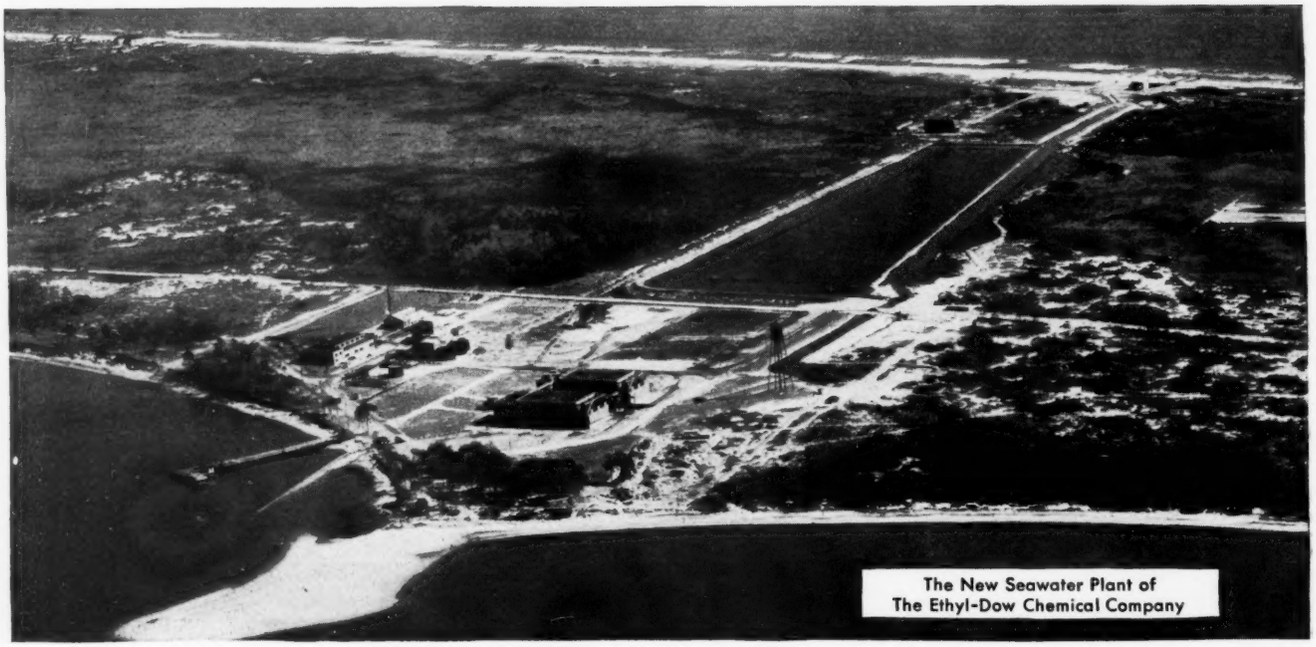
Exports of chemicals from Germany in '33 were valued at 695 million marks, a reduction of only 4½% from the preceding year, and in terms of tonnage many leading products registered notable expansion. At the close of '33 approximately 350,000 persons were employed, representing a reduction of 20% in unemployment accredited to that industry at the beginning of the year.

Heavy price cuts in foreign quotations made by German exporters of many chemical products would not have been possible, Mr. Concannon has pointed out, had not foreign bondholders been willing to take cash settlements at substantial discounts. Supply of these frozen credits has been greatly reduced in recent months, and the discount has declined, depriving the exporter of some of his advantage. German dollar-bonds falling due during the 1st half of '34, however, may possibly bring larger quantities into the market.

Legislation on Patents

Legislation is being considered in Germany for placing restrictions upon the rights of German nationals to dispose of patents and inventions, owned by them, to foreign interests. It would appear that the proposed legislation is based somewhat upon the principle whereby German nationals are obliged to formally declare and make available to the Reich Government their security and other financial holdings in foreign countries as a means of enabling the Government effectively to

ANOTHER OUTSTANDING DOW CHEMICAL COMPANY ENGINEERING ACHIEVEMENT



The New Seawater Plant of
The Ethyl-Dow Chemical Company

NEW PLANT EXTRACTS BROMINE FROM WATERS OF THE ATLANTIC

Two features mark this outstanding achievement in chemical engineering:

The first commercial extraction of bromine from ocean water.

The construction of this large plant in the short period of five months.

The Ethyl-Dow Chemical Seawater Plant in North Carolina was built to supplement the supply of bromine available from the Dow Chemical Plant at Midland, Michigan. The demand for bromine used in the manufacture of Ethyl fluid has grown so rapidly that an inexhaustible supply has become desirable.

Ocean water pumped into this plant at the rate of 26,000 gallons per minute yields 15,000 pounds of bromine daily; enough for the anti-knock fluid in millions of gallons of gasoline. It is hoped this leads the way to the recovery of other valuable products existing in the oceans of the world.

This visible mark of progress is typical of the scientific developments continually applied to the 250 Dow Chemical products now in commercial use and in the development of others to meet new industrial applications and uses.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

TRADE DOW MARK

control foreign exchange and financial situation. A special committee has been appointed, responsible to the newly formed Foreign Trade Council, to study and report upon the various proposals that have been submitted for meeting the Government's desires.

If such a restrictive law is passed, it will doubtless have direct effects upon numerous American chemical concerns, interested in exploiting German patents in the U. S. and elsewhere, as in addition to agreement with the owners of the patent rights, prospective buyers and exploiters will have to secure approval of the Reich Government to any proposed sale or license agreement.

I. G. Dividend

I. G. has declared a dividend of 7% for '33, unchanged from '32. For '33, company reports gross profits amounted to rm. 514,000,000, compared with rm. 487,400,000 in '32. Net profits increased to rm. 49,140,000 from rm. 47,010,000 in '32.

Synthetic Agreement

European synthetic nitrate agreement which was arranged 2 years ago has been prolonged to June 30, '35, without modification and by unanimous consent. Conference was attended by German, French, British, Italian, Dutch, Belgian, Norwegian, Swiss and Polish representatives.

Nitrate Pact

German-Chilean trade agreement, whereby Germany undertakes to allow duty-free importation of 106,000 metric tons of Chilean nitrate with the possibility of increase to 150,000 tons during year ending June 30, '34, provides that 40% of the profits resulting from the sale of the Chilean product will be placed at the disposal of the Reichsbank, the Reichsbank utilizing 20% for the release of frozen German assets in Chile, and the other 20% for financing sales of German goods to Chile. Distributors of Chilean nitrate will be required to continue to adhere to all the requirements governing the German nitrogenous fertilizer market as established by the German Nitrogen Syndicate, including schedule of prices, terms, etc., so there will be no danger of price underbidding or market disturbance.

Nitrogen Notes

The Netherlands has established an import quota on nitrogen fertilizers, Czechoslovak Nitrogen Works has developed 2 new phosphate fertilizers, 1 called "Citrophosphat" and the other "Ammoncitrophosphat."

A "gentlemen's agreement" is reported concluded between Japanese concerns and the European nitrogen syndicate on sulfate of ammonia. This is expected to lead to further stabilization.

Soviet Potash

Soviet's 1st potash mine and world's largest was recently opened at Solikamsk in the Urals: Capacity, 4,500 tons of potash a day, as compared with an output of 3,000 tons a day of the largest potash mine in Germany, at Gluckauf. New mine is most modern in its construction and represents an enormous subterranean city with 13,000 meters of entries and drifts, built at a depth of 820 ft. Working in conjunction with the mine is a large mill for grinding potash ore and a chemical plant for the manufacture of concentrated potash salts. A 2nd mine of similar capacity is now under construction near Solikamsk.

Jap. Chemical Industry

Red Star, official newspaper of the Soviet Army, summarizes Japanese chemical expansion: "This industry has developed by leaps and bounds in the last 5 years. Particular attention has been paid to the development of divisions producing explosives and poison gas. Production of nitrogen in '33 was 4 to 5 times larger than in '28.

"On the completion of synthetic nitrogen plants Japan will be able to produce 350,000 tons of nitrogen yearly, not including 50,000 tons of nitrogen produced in the shape of cyanamide of calcium, which greatly exceeds the needs of agriculture.

"Works for the production of caustic soda and the production of chlorine as a by-product also have been extended, capacity is now 100,000 tons of chlorine yearly and will be increased 1½ times in '35."

Canadian Carbon Back

The first carbon black plant in Canada 9 miles north of Craigmyle, Alta, 122 miles east of Calgary, is expected to be in production by July. Plant is being built by the Pioneer Carbon Black Co., Ltd., at an estimated cost of $20,000.

Chilean Floods

Santiago, Chile, news reports Apr. 1 indicated widespread damage to nitrate plants at Antofagasta from the overflowing of rivers after heavy rains. The Officina, Baqedano and other plants are partially submerged and unable to operate. Sale of Chilian nitrate in U. S. is expected to reach 1,100,000 tons, as against 800,000 tons last year.

Foreign Trade

German dye exports, which had declined in '32, were still less in volume in '33, but showed an increase in mark value. Totals were:—'32, 29,142 tons, valued at 133,662,000 marks; '33, 26,818 tons, valued at 133,738,000 marks.

Tariff Reports

Tariff Commission has just released "Statistical Study of N. Y. Imports in 1933 of Chemicals (not specially provided for in the Tariff Act of 1930).

Entering Thru N. Y.

Out of a total of $2,275 762 in chemical imports, under Paragraph 5 of the tariff entering during '33, about 65%, or $1,479,805, were cleared at N. Y. City.

New Construction

R. H. Cartlidge, Jackson County, Fla., is planning on erection of a fertilizer plant . . . Union Carbide has awarded contract for construction of a new laboratory at Niagara Falls for the metallurgical division of Union Carbide & Carbon Research Laboratories, a subsidiary. Upon completion research division in L. I. City will move to Niagara Falls . . . Stone & Webster will construct a $200,000 office building for Monsanto at St. Louis. Air conditioning and acoustal treatment will be applied throughout the building . . . Rensselaer Poly is reported planning a $500,000 chemical engineering laboratory.

Associations

Skytop Lodge, Skytop, Pa., will hold 1 of the largest annual M. C. A. meetings on June 7-8, according to Secretary Watson. At the same place the Synthetic Organic Chemical Manufacturers will gather for its annual outing. A joint dinner of both associations will feature events listed for June 7. Several surprises are promised.

To The Rescue

Support for U. S. Bureau of Standards is urged by the A. C. S., which asserts that lack of funds threatens the Bureau's "expanding national and international program."

"Establishment and maintenance of certain fundamental standards are vital to the advancement of the science of chemistry," says a resolution adopted by the Council of the Society.

Newly Formed

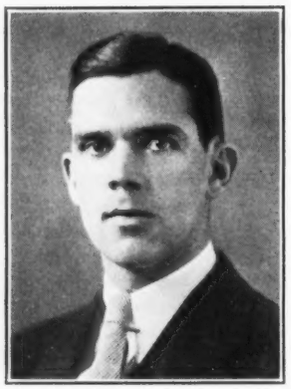
Natural Organic Products Association has been formed with Ray C. Schlotterer, 41 Park Row, N. Y. City, as temporary secretary. Code hearing was held Apr. 20.

Association Notes

Columbia's Dr. Harold C. Urey was the recipient of the '34 Willard Gibbs Medal (Chicago A. C. S. Section) for his work on "heavy hydrogen" . . . A. R. Murphy, du Pont's dyestuff manufacturing dept., spoke on "The Manufacture of Azo Dyestuffs and Their Application To Silk, Acetate, and Viscose Rayons" at the April meeting of the N. Y. Section, A. A. T. C. & C., held at the Chemists' Club . . . Golf, night clubs, attendance at NBC broadcasts, a shore luncheon at Jones' Beach and the annual banquet are

some of the more important entertainment features planned by B. J. Gogarty (Commercial Solvents) for the Silver Jubilee Convention of the Flavoring Extract Manufacturers' Association.

Samuel Lenher of du Pont's organic chemicals dept., spoke before the American



Tells N. Y. audience about "soapless soaps"

Institute of the City of N. Y. on Apr. 12 on the subject—"Soapless Soaps" . . . Next meeting of International Congress of Pure and Applied Chemistry will be held in Rome in '37 . . . J. E. Underwood, Penn Salt, was the speaker at the April meeting of the Chemical Club of Philadelphia.

Personal

Cyanamid's Dr. Landis was guest speaker at the Bond Club of N. J. at the April meeting held at the Robert Treat in Newark . . . C. A. A. Stine, du Pont vice-president, discussed approaches to chemical research in a recent Franklin Institute lecture . . . William S. Gray, Jr., has been elected to the Board of Governors of the Princeton Club . . . Felix Berk, head of F. W. Berk & Co., is now on a Southern trip recovering from a recent operation . . . Eugene T. Eichelberger, treasurer of Standard Phosphate & Acid is ill . . . Dr. C. E. Kenneth Mees, Eastman Kodak research director, will deliver the Sir Henry Trueman Wood Memorial Lecture before the Royal Society of Arts, London . . . Ernest K. Halbach, president, General Dyestuff, is again directing the chemical and paint division in the Salvation Army Drive . . . Bakelite's advertising manager, Allan Brown, was a speaker at the recent Fashion Group's exhibit of "man-made" materials at the RCA Bldg., N. Y. City . . . J. P McGovern, general counsel for the Industrial Alcohol Institute and the Industrial Alcohol Committee of the N. P. V. & L. Association, is now a real Kentucky Colonel . . . C. B. Peters, vice-president, Synthetic Nitrogen Products, has returned from Porto Rico.

John J. Watson, president of the N.F.A., and president of International Agricultural, is back in N. Y. City after spending the winter months at his office at Albany, Ga. . . . John Hay Whitney, well-known sportsman and recently elected board chairman, Freeport Texas (CHEMICAL INDUSTRIES, Apr., '34, p. 345) has announced "I will have another try at it next year" as he arrived back on the Majestic, referring to the Liverpool Grand National Steeplechase. Mr. Whitney has been mentioned for membership in the new N. Y. State racing control board . . . Givaudan-Delawanna's vice-president, Dr.

Givaudan's Kunz is Europe bound

Eric C. Kunz, sailed last month for an extended European visit . . . Harvard's president, Dr. James B. Conant, will receive the annual American Institute of Chemists' Medal at the annual meeting on May 21 . . . N. F. A. secretary, Charles J. Brand spoke over an NBC network on Apr. 13 on "Conservation of our Soil and Fertilizer Resources."

Personnel

Permanent Code Director

Dean Clark, prominent management engineer, has been selected as permanent director of the Chemical Code, succeeding Howard Huston, Cyanamid, who has been acting as temporary director.

Mr. Clark graduated from the engineering school of Cornell in 1898 and subsequently spent 7 years as assistant engineer and assistant to the president of the Newport News Shipbuilding and Drydock Co. and the New York Ship Building Co., respectively. In '05 he became factory manager for Smith Premier Typewriter, and 7 years later he became chairman of the executive committee and manager of the South Bend Watch Co., which was in financial difficulties and which he brought back to a paying basis. After 3 years with the watch company he became vice-president in charge of production of Savage Arms.

During the war period he was called to Washington to serve as special assistant to the Chief of Ordinance, U. S. A., in order to stimulate and balance requirements of small arms production throughout the country. He also set up the 1st organization of the Claims Board in Washington. After that service he joined National Carbide, a unit of the Carbide and Carbon, where he remained 7 years as assistant to the general manager in the production of carbon products and dry batteries. He reorganized the producing side of the business. In addition to this, he was treasurer for 3 years of General Silk, which merged 10 silk producers; and his last activity prior to becoming a private consultant was with the General Cable, where he spent a year in developing the organization and introducing methods of operating control.

Mr. Clark has his private office at 21 E. 40th st., N. Y. City, but as a director of the chemical code he will have temporary offices in the Rockefeller Center.

Billings Advanced

Godfrey L. Cabot's directors (carbon black), have elected Edmund Billings a vice-president. Mr. Billings is very well known among manufacturers of rubber,

Carbon black technologist and salesman—now a director

paint, and ink products in the U. S. and abroad, as sales manager of the Cabot organization for the past 10 years. He has been especially active in the chemical engineering branch of his field, having been closely identified with the invention of the method of producing "Spheron," a rubber black which has made bulk handling practical in the rubber industry; "Charon," a black pigment for concrete, and several other advancements in the form and uses of carbon black.

Hercules' Appointments

At Hercules annual directors' organization meeting L. N. Bent was elected vice-president and a member of the executive committee relieving T. W. Bacchus on the committee. Mr. Bacchus continues as vice-president and member of the board. Mr. Bent, who was general manager of the naval stores dept., is succeeded by A. B. Nixon, formerly head of the cellulose products dept. Mahlon George Milliken will fill Mr. Nixon's place. Mr. Milliken was superintendent of the company's nitrocellulose plant at Union. E. F. Thoenges, assistant superintendent, moves up into the superintendency.

Whittaker Resigns

J. M. Whittaker has resigned as vice-president and director of Chilean Nitrate Sales. Mr. Whittaker graduated from M. I. T. in '26, and was with H. J. Baker and Bros., and also the Barrett Co. previous to his Chilean Nitrate Sales connection. He has not announced any future plans as yet.

Lovejoy Kodak President

Election of Frank W. Lovejoy as president of Eastman Kodak was announced Apr. 11. He succeeds William J. Stuber, who was elected chairman of the board, a position vacant since the death of George Eastman in '32.

Alabama By-Products Elects

Alabama By-Products Corp., Birmingham, Ala., has elected following directors: Albert T. Bush, Erskine Ramsay, Horace Hammond, H. F. Moore, John W. Porter, H. L. Morrow, and E. L. Hampton. Directors elected the following officers: Chairman Erskine Ramsay; president, Horace Hammond; vice-president, Albert Y. Bush; treasurer, H. L. Morrow; and secretary, J. A. Shook.

Woods Now Chilean Nitrate

J. A. Woods, who recently resigned as vice-president and sales manager of Armour Fertilizer, has been elected a vice-president and director of Chilean Nitrate Sales.

Other Personnel Changes

Tennessee Corp. directors were re-elected at annual meeting . . . Albert S. Low is now vice-president and chief engineer of the Austin Co., nationally known Cleveland engineers and builders. He succeeds Harry E. Stitt, who will continue in a consultant capacity . . . H. S. Colby has been appointed general sales manager, Combustion Engineering . . . E. E. Oppenheimer, consulting chemist, Newark, N.J., is now with Foster D. Snell, Inc. . . . A. B. Miller, formerly consulting linoleum expert with Foster D. Snell, has taken a similar position with the Paraffine Companies, Emeryville, Calif. . . . A. J. Mellott, a Kansas City lawyer, now heads the alcohol tax unit of the Internal Revenue Bureau . . . Du Pont has announced engagement of V. A. Cosler, well-known rubber technologist, as technical consultant on the application of "Duprene"—synthetic rubber . . . Stephens-Adamson Mfg., Aurora manufacturer of conveying apparatus, has re-opened sales-engineering offices at Pittsburgh and Huntington, W. Va. Harry W. Banbury heads the Pittsburgh offices at 1206 Gulf Bldg., and D. W. Allen the West Virginia district.

Gordon Collins, formerly chemist with E. H. Clapp Rubber, is now with Naugatuck Chemical . . . H. S. Wherrett, Pittsburgh Plate Glass' president, has been elected a Westinghouse director . . . Chester R. Austin has joined the Battelle Memorial Institute, Columbus, to work on Ohio shales and surface clays with special reference to applications to the ceramic industry . . . A. C. Richardson is another addition to the Institute staff and will work under Byron M. Bird, chief concentration engineer . . . E. C. Smith has joined M. W. Parsons and Plymouth Organic Laboratories as sales manager . . . Joseph S. Whittington has resigned as secretary-treasurer of the Independent Fertilizer Manufacturers' Association to become associated with F. W. Berk & Co., N. Y. City . . . Arthur Mesfeldt, R. & H. division of du Pont, has been transferred from N. Y. City to Cleveland . . . W. W. Whittington has been promoted to executive vice-president of Acme Guano, Baltimore.

Cyanamid Moves

Biggest moving job into Rockefeller Center to date was accomplished over the week-end of Apr. 14-15 when American Cyanamid, American Cyanamid & Chemical and subsidiaries took possession of 4 floors high in the RCA Bldg., N. Y. City's newest "skyscraper" office building. More than 400 vanloads were required for the move, and so efficiently was the whole operation planned that employees arriving Monday morning were ready to conduct business at once.

Cyanamid has clung closely to 5th ave. Fifteen years ago offices at 511 5th ave. were established. Continual expansion finally forced a move to 535 5th ave. where 28 floors were necessary in the tower of the Bank of U. S. Bldg. (now one of the Ruppert chain of office buildings). Still

A private staircase provides easy access to Cyanamid's 4 floors in new RCA Bldg.

further expansion and a need for concentration compelled the move to Rockefeller Center.

Light, air and quiet are everywhere evident in this most modern of business layouts. There are no "inside" offices, the floors having been arranged so that each office has maximum light, and at the same time absolute privacy.

Throughout, the place is air-conditioned. And even in the busy clerical departments, where long rows of typewriters and calculating machines are plying busily, there is a subdued, restful atmosphere . . . for

"Light, air and quiet are everywhere evident in this most modern of business layouts."

these noises and a hundred others that scientists tell us distract the worker, are absorbed by soundproof ceilings.

One of the indications of the thoroughness with which these new headquarters were planned, is the specially constructed stairway which connects the executive floor with the sales floor and the accounting department offices. It gives immediate and private communication between these 3 important departments. Both the stairway and the attractive circular foyer from which it rises, are floored in "Zenitherm," 1 of the many products of the company.

According to officers of the company, this move to modern, spacious quarters was made with the express purpose of establishing the various departments of the business into closely unified, smoothly-operating groups, to handle the increasing volume of business.

Four large floors now accomodate the departments which were spread out, at the former address, over some 28 floors. This "horizontal" plan has made it possible to arrange related departments together by floors. Executive offices center on 1 floor; another floor is occupied by the sales department; a 3rd houses the accounting and affiliated divisions; and a 4th floor is the location of the engineering staff.

Each detail contributes to making these offices up-to-the-minute. Even the desks in the clerical departments, are modern, simple, eminently practical in design. Numerous and tastefully simple lighting fixtures are prepared to diffuse the proper brilliance, though they will probably not be needed except in winter or after hours, as the offices, beginning at the 57th floor and comprising the 58th, 59th, 60th and part of the 61st floors, are in themselves brilliant with daylight.

Customs and Tariffs

A fourfold increase has been decreed in the French tariff on benzol and other light distillates of coal. U. S., which has built up a large trade in these products over recent years and is now by far the largest exporter of them to France, will be the chief sufferer.

The tariff, which has been 10 francs general and 2½ francs minimum a metric quintal gross, now is respectively 42 and 14 francs. U. S. had an intermediate rate of 8½ francs. Although the new decree does not announce the present position of the U. S., the corresponding intermediate rate in the new schedules would be approximately 35 francs.

The American product is used for motor fuels when mixed with alcohol or gasoline. In '32 U. S. exported to France 14,893 metric quintals out of a total of 64,444 quintals of imports, and in '33, 52,154 out of a total of 92,854 metric quintals.

In the report accompanying the decree it is stated that foreign competition is placing the French benzol industry in a critical situation and that the time has arrived to take action to permit French gas and coke plants to find legitimate regular outlets for benzol manufactured by them.

Netherlands Exempts

Under a Netherland ministerial decree exemption from the sales tax of 4% may be secured for certain disinfectant and preservative materials of imported or of domestic origin, for use in agriculture, horticulture, cattle raising or tree spraying, subject to special license from the local inspector of import duties and excise taxes.

Changes and Possibilities

Great Britain has raised import duty on both di and tri-sodium phosphates to the general level of 20% duties instead of 10%.

A suggestion that the domestic potash industry may ask for a protective tariff on its product was made in the Senate Apr. 16 by Senator Carl A. Hatch (New Mexico).

A Mexican decree, published and effective Mar. 5, '34, includes toluol, xylol, and coal-tar naphthas with benzol for the application of the consumption tax of 8 centavos per liter. On the imported products tax is levied at the time of importation; on those produced in Mexico, at the time they leave the production plant.

Litigation

G. E.—Paramet—Correction

CHEMICAL INDUSTRIES in reporting filing of a suit by G. E. against Paramet Chemical (April '34, p. 347) stated: " . . alleging infringement of a patent covering manufacture and sale of resins and resinous materials." News item should have been more specific, stating that the action deals specifically with alleged infringement of the R. H. Kienle Patent, No. 1,893,873. Patent in question involves the resin known as "Esterol" and has nothing to do with other Paramet products, "Paranol," "Paradura," "Paramet" Ester Gum, and other resins manufactured by Paramet Chemical.

Catalin Winner

Judge Moscowitz, U. S. District Court, Brooklyn, signed a consent decree on May 4, ending patent suit brought about a year ago by Catalin Corp. against Marblette Corp.

At the offices of Catalin it was stated that this litigation had been settled by granting a license to Marblette, who recognize Catalin Corp.'s patents and agree to pay royalty on their entire output.

Every manufacturer of chemical or allied products is urged to register with the Chemical Alliance at its headquarters RCA Bldg., N. Y. City.

Cyanamid In Crude Rubber

American Cyanamid has opened a division to import and deal in crude rubber. Corporation already is in close contact with the rubber consuming industry, in as much as it is a large factor in the sale of rubber sulfur, rubber accelerators, pigments, compounding ingredients, and heavy chemicals. Crude rubber division will be under the direction of Bancroft W. Henderson, who has had broad experience in crude rubber, beginning his business career in that article as early as 1907. Mr. Henderson has an extensive acquaintance in the rubber manufacturing industry both in this country and abroad; he has made several extensive trips to the Far East, visiting the countries of production, returning from his last trip in the Fall of'33

Allen, Burroughs Comment

The Washington Post recently sent telegrams to many prominent leaders in business, banking, and industry asking them to comment on the statement of Chairman Rayburn of the Interstate Commerce Committee of the House that it is not the Securities Act but lack of a market which is preventing the sale of securities. Many replies were published in the *Post* on April 6, and among them was the following from C. F. Burroughs, president, F. S. Royster Guano, and a member of the fertilizer recovery committee:

"Answering your wire, it is my opinion that the very rigid and minute restrictions in the present Securities Act will restrict the issuance of even the best securities to a minimum. There is evident a strong and wide-spread demand for such securities, this being held in check, however, by the general feeling of uncertainty."

Another wire was received from E. M. Allen, president, Mathieson Alkali:

"Any statement that the Securities Act is not preventing the sale of securities, with the attendant loss of millions for construction and the keeping of thousands of men out of work, is so far from the actual facts that a statement contradicting such misleading views hardly seems necessary. Mathieson Alkali Works undoubtedly is consulted by many people contemplating putting out stock, due to the fact that we went through the filing of a certificate of registration when we put out over $6,000,000 of stock."

"Quotes"

J. Davidson Pratt, general manager, Association of British Chemical Manufacturers, before Nottingham Section of the Society of Chemical Industry: "It is true that Great Britain flourished and became a great exporting nation under a Free Trade policy. It is equally true that she was nearly ruined under the same policy."

Heavy Chemicals

Satisfactory Tonnage

Seasonally higher levels in most industrial industries caused a further expansion in chemical consumption in the month just closed. In the aggregate shipments were very encouraging, although it was apparent that manufacturers were ordering out largely for immediate needs only. Consumption of chemicals used directly or indirectly in the automotive field was large while some curtailment was reported in the activity in the textile and tanning fields. Some let-up was noted in rayon manufacture, partly due to labor troubles in certain sections.

Outstanding price advance was that of 10c in copper sulfate, the result of a definitely higher level for the metal. Copper cyanide is now being offered on contract at 1c under spot, the contract price being 37-39c; zinc cyanide is also offered on a contract basis at 36c. Weakness developed in both calcium and lead arsenates and reduced prices were announced.

Important Price Changes

ADVANCED

	Apr. 30	Mar. 31
Acid tungstic	$1.35	$1.25
Copper oxide, red	.15	.14½
Copper sulfate	3.85	3.75
Glycerine, soaplye	.08½	.08¼
saponification	.09⅜	.08
Sodium tungstate	.83	.73
Tin oxide	.58	.57

DECLINED

Calcium arsenate, job.	$0.05	$0.05⅜
Lead arsenate, job.	.08	.09
Tin tetrachloride	.27	.27½

Richmond Buys

Belle Alkali has taken City of Richmond's 60 ton chlorine requirements at $2.43 per 100 lbs. Nine bidders submitted identical prices and choice was made by lot. Last year's price was $2.10.

Grasselli was low bidder on alum for Richmond, Va., with a price of $1.46 against $1.37½ a year ago. Tonnage involved—1,200 tons.

Battley Succeeds Herty

Capt. Joseph F. Battley, Chemical Warfare Service, who has been serving as assistant deputy administrator of the chemical section under George L. Berry, administrator of Division 3, is now a deputy administrator, succeeding Dr. Herty, who has headed the chemical section since last December. Capt. Battley's training emminently fit him for the task of having jurisdiction over 19 basic codes of fair competition and 23 supplemental codes. He is a graduate of Harvard's School of Business Administration and of the Army Industrial College. Among his military assignments have been those of executive officer, C. W. S., Edgewood Arsenal, and executive officer, N. Y. and Pittsburgh procurement service.

He was on duty in the office of the assistant secretary of war in Washington, when last July he was borrowed by General Johnson, since which time he has been on continuous NRA duty.

Sulfur deposits are reported near Chatham, Ontario, Canada, by American Engineering Co.

Dow's 50% Stock Dividend

Dow has declared stock dividend of 50% on the no-par common, payable July 2 to stock of record June 16. James T. Pardee, vice-president and secretary reports it is contemplated that present rate of dividends will be maintained provided business conditions and earnings in the future shall so warrant.

2nd Quarter Tonnage

Freight car loadings in 2nd quarter will be about 10.7% above actual '33 loadings, according to estimates made by the 13 Shippers' Regional Advisory Boards. Loadings of chemicals and explosives in '33 totaled 14,941. Estimate calls for 16,594 cars, an increase of 11.1%. An increase of 14.1% (72,808 against 63,826) is looked for in the fertilizer group.

Fine Chemicals

Tartaric Derivatives Higher

Higher raw material costs forced a 1c advance in cream of tartar; a 1c advance in Rochelle Salt; and a ¾c advance in Seidlitz Mixture. Glycerine continues to show very firm tendencies with stocks very scarce. Saponification and soaplye grades were advanced. Although no change in the price for bismuth metal was made in the past month, several of the bismuth salts were increased 10 to 15c. Silver nitrate prices were off from the previous month's close as the metal weakened. Mercury was again firm at the $76-$78 level.

U. S. Camphor

U. S. is producing approximately one-third of its camphor requirements in laboratories, using turpentine as raw material. Three years ago when natural camphor was higher in price, three-fourths of our needs were produced in chemical retorts. In addition, considerable quantities of the synthetic product is imported from foreign countries, chiefly Germany. Imports in '33 reached 893,000 lbs., valued at $220,409. Imports of natural camphor, both crude and refined, in '33 totalled 3,608,000 lbs., valued at $890,100. Imports of natural have declined rapidly, both in value and quantity, as domestic production of synthetic camphor has increased.

Imports of natural in '19 totalled 4,488,000 lbs.; crude being invoiced at 92c per lb. and refined at $1.70. By '29 imports had increased to 5,594,000 lbs. after a 10-year period of fluctuation but the invoice price had declined to 38c for crude and 55c for refined. Invoice price continued to decline as production of synthetic increased until in '33 it reached the low of 21c per lb. for crude and 25c for refined. In February, '34, import prices rose to 24c for crude and 45½c for refined.

Important Price Changes

ADVANCED

	Apr. 30	Mar. 31
Acid tungstic, C. P.	$2.30	$2.20
Bismuth, subcarbonate	1.75	1.60
" subgallate	1.75	1.60
" subnitrate	1.55	1.40
" subsalicylate	2.55	2.45
" sulfocarbolate	3.50	3.35
Calcium hypophosphite	.65	.55
Calcium sulfocarbolate	.47	.44
Cream of tartar, powd., and cryst.	.19¼	.18¼
Potassium hypophosphite	.75	.65
Rochelle salt, powder	.14½	.13½
crystals	.15½	.14½
Seidlitz mixture	.12¼	.11½
Sodium hypophosphite	.75	.65
Sodium sulfocarbolate	.26	.23
Zinc sulfocarbolate	.24	.21

DECLINED

Silver nitrate	$0.31⅞	$0.33⅜

Production of natural in Taiwan in '33 reached 5,366,393 lbs., compared with 5,848,028 lbs. in preceding year according to a report to the Chemical Division, Bureau of Foreign and Domestic Commerce, from Consul John B. Ketchan, Taihoku, Taiwan. More than 65% of this was shipped to the U. S. where it is used chiefly in the manufacture of pyroxylin products.

German Camphor Exports

Adverse course of Germany's export trade in synthetic camphor in the early months of '33 subsequently improved in the spring months and throughout the remainder of the year. As a result, total exports for the entire 1st 11 months amounted to 1,231 metric tons, compared with 1,268 tons in the 1st 11 months of '32. However, losses recorded in '32 and previous years were not regained, and the '33 trade remained far below the levels of previous years, comparing with exports of 1,877 tons in '31, 2,181 tons in '30, and 3,049 tons in '29.

Domestic Glycerine

Domestic production of crude and chemically pure glycerine declined in '33,

compared with previous years, but an increase was registered in output of the dynamite grade.

	Pounds	
	1932	*1933*
Crude glycerine, 80% basis	133,918,825	118,083,304
Dynamite, glycerine	41,538,670	45,534,280
C. P, glycerine	63,623,975	58,585,438

Imports of both crude and refined increased in '33 over '32 incoming shipments, as will be seen from the following table:

	Crude		*Refined*	
	Pounds	*Value*	*Pounds*	*Value*
1932	5,582,252	$204,628	2,336,606	$140,914
1933	6,204,636	232,817	2,777,918	167,093

Italian Mercury

Italian mercury production amounted to 612 tons last year, as compared with 858 tons in '32. Exports, however, increased during 1st 11 months of '33 to 838 tons from 731 tons during the 11-month period in '32.

Citric Production

Chemiker-Zeitung estimates '32 citric acid production at 10,500 metric tons, fermentation process accounting for 75% of the total. U. S. production was 3,500 tons, 2,500 tons synthetically. English output was divided—2,000 tons fermentation, 400 tons synthetic. Italy's 1,900 tons was entirely from lime citrate.

Chemical Profits

According to a compilation made from the earnings statement of 166 corporations by Eastman, Dillon, chemical industry showed up extraordinarily well. Ten chemical companies reported net income of $22,192,000 against $9,485,000 a year ago.

Company News

Southern Chemical Formed

American Cyanamid and Pittsburgh Plate Glass jointly have formed Southern Chemical Corp., with a Delaware charter, and have qualified to do business in Texas New Corporation will produce a varied line of chemicals in connection with the operation of the alkali plant being constructed at Corpus Christi, Texas, by Southern Alkali, also jointly owned by the two above mentioned Companies.

Officers of Southern Chemical are as follows: Chairman, W. B. Bell; president, H. L. Derby; vice-presidents, C. M. Brown, K. F. Cooper, H. A. Galt, H. S. Wherrett; treasurer, R. C. Gaugler; asst. treasurers, A. B. Savage, K. C. Towe; secretary, W. P. Sturtevant; asst. secretarys, J. H. Heroy and G. R. Martin.

It is expected that the plant at Corpus Christi, which has been under construction for something over a year, will be in operation this Fall. A 30 foot channel is being dredged to the private dock which will enable ocean-going vessels to load and unload at the plant and will greatly facilitate handling the export and coastwise business which Southern Chemical expects to transact. (See Roto Section, this issue).

Now Sell "Artic"

R. & H. Chemicals Dept., du Pont, has appointed following distributors of "Artic" (methyl chloride) for refrigeration service work:

National Ammonia Co., Inc., Frankford, Philadelphia, Pa. (in New England, New York, New Jersey, Pennsylvania); Maryland Chemical Co., Bayard & Russell Sts, Baltimore, Md.; Merkel Bros. & Co., Burbank & C. L. & N. R. R., Cincinnati, Ohio; Eaton-Clark Co., 1490 Franklin Street, Detroit, Mich.; Chemical Distributors, Inc., 365 N. Illinois Street, Chicago, Ill.; Enochs Sales Co., Fernwood, Miss.; G. S. Robins & Co., 310-316 S. Commercial Street, St. Louis, Mo.; Thompson-Hayward Chemical Co., 29th & Southwest Boulevard, Kansas City, Mo.; Hunzicker Bros. Co., 105-107 E. California Street, Oklahoma City, Okla.; Denver Fire Clay Co., P. O. Box 1107, Denver, Colo. and Salt Lake City, Utah; L. H. Butcher & Co., 274 Brannan Street, San Francisco, Cal.

These distributors are now prepared to supply "Artic" to the trade.

Barsky & Wilson Move

George Barsky and Ernest D. Wilson, consultants, have moved from 521 5th ave. to more extensive office and laboratory space at 202 E. 44th st., N. Y. City. Telephone is the same, Murray Hill 2-3689.

Ward Process Chemicals

Organized to succeed Ward Process Chemicals, Inc., Chemical Products, Inc., at Tulsa, Oklahoma, will follow a policy of diversified service to meet the needs of the Tulsa territory. Its management will be directed by an executive committee composed of George J. Thombold, president; J. H. Welch, secretary, and treasurer, Herman Kopp, consulting chemist; D. D. Mungen and N. R. Graham.

New Pigment Factors

Herron & Meyer (crude rubber) have opened a pigments division at N. Y. City offices of the company, 82 Beaver st., under the direction of W. A. Herron.

James H. Devine has opened offices in Chicago's Merchandising Mart and will represent manufacturers of dry colors, pigments, etc., in the Chicago area.

Equipment Companies

Barde Steel and Doran Co., both of Seattle, are now distributors of "Enduro" stainless steel. Enduro is produced by the central alloy division, Republic Steel. Latter company has also appointed Gate City Iron Wks, Omaha, as distributors of "Toncan" copper molybdenum iron.

Wilbin Instrument, 40 E. 34 st., N. Y. City, is a new company formed to manufacture a complete line of instruments to measure humidity, pressure, vacuum, and liquid levels.

Littleford Bros., fabricators of plate and sheet steel, is celebrating a golden anniversary this year.

Here and There

Godfrey L. Cabot has added 5 new self-clearing gravity type tank cars for handling carbon black, bringing the Cabot fleet up to 10 cars of this type . . . Merck & Co. is asking companies from whom they purchase to fill in a questionnaire stating whether or not they are operating under an approved code of fair competition or the President's Reemployment Agreement . . . Carbide will again exhibit at the Chicago World's Fair.

Glyco's inorganic soluble resin "Stacol" has been improved further so that even concentrated solutions do not crystalize from water solutions on standing . . . Empire Distilling, newest alcohol producer, has appointed Harry Cohen, Chandler Annex Bldg., Atlanta, Ga., as Southern distributor . . . Charles Hardy, Inc., N. Y. City, has been appointed sales representative by the Aluminum Co. of America for all countries of the world aside from continental U. S. for the introduction and sale of activated alumina which is finding wide application in the chemical and metallurgical fields.

Exclusive license contracts have been signed with leading electric wire and cable manufacturers in 5 European countries by Thiokol Corp., whose main offices and factory are at Yardville, N. J. . . . General Atlas Carbon has just completed 2 new producing units at its Pampa, Tex., plant.

In New Locations

Var-Lac-Oid Chemical is now at Centennial Bldg., 116 Broad st., N. Y. City . . . N. Y. City offices of Pennsylvania Alcohol and the Franco-American Chemical Wks., both Pennsylvania Sugar subsidiaries, are now located at 342 Madison ave . . . Solvay's Pittsburgh office is now located in suite 1107 Gulf Bldg. Former office was in the same building . . . The Werner G. Smith Co., Cook Swann Co., and the Wyandotte Oil & Fat Co., all located at 122 E. 42 st., N. Y. City, have removed to the Woolworth Bldg., 233 Broadway, 46th floor . . . Hercules Powder's Chicago offices are now at 332 S. Michigan ave . . . Archer-Daniels-Midland, formerly at 225 Broadway, N. Y. City, is now in the Woolworth Bldg., 46th floor, 233 Broadway . . . Frey & Horgan, brokers in oils, tallow, etc., are now located at 17 State st., N. Y. City with a new telephone number, Whitehall 4-2542-5 . . . Stillwell & Gladding, N. Y. City analytical chemists, moved May 1 to 130 Cedar st . . . J. T. Baker has moved N. Y. City offices to suite on the 17th floor of the Graybar Bldg. Offices were formerly on the 12th . . . F. W. Berk & Co. has gone from the 8th to the 47th floor of the Chrysler Bldg . . . Consolidated Products (machinery and equipment) have enlarged offices at 13-14 Park Row, N. Y. City, to take care of an increased volume of business.

Washington

30 Hour Week Bill

Chairman Connery of the House labor committee informed the chamber on May 3 that conferences were under way with Administration officials which he hoped would result in drafting of amendments to the compulsory 30-hour week bill which would make this legislation acceptable to the White House.

The labor committee chairman, co-author with Senator Black of Alabama of the measure, said he expected to confer with Secretary of Labor Perkins and Donald Richberg, NRA legal advisor, on the subject of amendments to the bill, and that he was hopeful this meeting would result in a satisfactory compromise.

At the same time, a petition to discharge the rules committee from further consideration of a resolution giving the 30-hour week bill legislative right of way was introduced in the House. Mr. Connery said he had no connection with this move to force a vote.

Trade Commission Rules

Federal Trade Commission has ordered Tuttle's Tite-on Cement Co. Chicago, manufacturer of a cement-like material used as a paint or lacquer in finishing refrigerators and furniture, to discontinue using words "porcelain" or "porcelain enamel" in the advertisement or sale of its product. In its findings, Commission said this company's product contained not more than 1% of silica and alumina, main constituents of clay, whereas true porcelain contains large percentages of clay.

Apparatus Standard Approved

Bureau of Standards announces acceptance by the laboratory apparatus industry of recommended commercial standard for interchangeable ground glass joints, stopcocks and stoppers and effective date—Sept. 1.

Emery Suggests

James A. Emery, general counsel for the National Association of Manufacturers, urged, before the Ways and Means Committee, revision of the proposed tariff bill to allow the President to switch articles to and from the free list in the negotiations of trade arrangements, but only upon approval of Congress.

Quicksilver Report Approved

President Roosevelt has approved the Tariff Commission's report on quicksilver. Briefly, the report denied that since the inauguration of NRA imports have endangered the maintenance of the code of fair competition under which the industry is operating.

NRA Appointments

George H. Mead has been elected chairman of the NRA Industrial Advisory

George H. Mead now NRA Advisory Board Head

Board. He is president, Mead Paper Corp., and was appointed to the Board on Mar. 1. On Feb. 21 he was appointed administration member of the Chemical Industry Code Authority (Chemical Industries, March, '34, p. 241).

NRA on Apr. 13 announced appointment of the following administration members on code authorities: Salt producing industry, W. H. Calhoun of Chicago, en-

Delong is administration member on soap, glycerine code

gaged in special work for Sears, Roebuck; soap and glycerine manufacturing industry, C. R. DeLong, N. Y. City consulting chemist; chemical manufacturing industry, Francis P. Garvan.

NRA has appointed Lieut. Harry A. Kuhn, C.W.S., U S.A., as administration member of the oxy-acetylene industry.

Code Notes

Code of Fair Competition submitted by the Sulphonated Oils Manufacturers' Association was heard Apr. 16.

Supplementary code for the industrial alcohol industry has been approved.

Equipment Hearing

A code for manufacturers of chemical engineering equipment, supplemental to the machinery and allied products code, was given a hearing before Deputy Administrator L. J. Martin Apr. 27. Code was presented by James E. Moul, president, Turbo-Universal Co., and also president, Chemical Engineering Equipment Institute. Code adopts wage and labor provisions of the master machinery code, and provides for uniform cost accounting system and open price listing, and outlaws sales below cost. Code authority would give representation to non-members of the institute.

NRA Victory

Right of the Federal government to fix minimum prices under the national industrial recovery act was upheld Apr. 2 by Judge John C. Knox, of the U. S. District Court, in N. Y. City.

Bureau of Standards has issued a booklet on radium protection.

Textile Chemicals

Important Price Changes

	Apr. 30	Mar. 31
ADVANCED		
Mangrove bark	$28.00	$27.00
Wattle bark	31.00	30.00
DECLINED		
Gambier Singapore cubes	$0.05	$0.05¾
Myrobalans, J2	16.50	17.50
R2	16.25	16.50
Sumac, Italian	70.00	72.00

At Knitting Exposition

Textile chemical supply houses exhibiting at the 30th Annual Knitting Arts Exhibition included American Aniline & Extract, Philadelphia; W. F. Fancourt & Co., Philadelphia; E. F. Houghton & Co., Philadelphia; W. H. & F. Jordan, Jr. Manufacturing Co., Philadelphia; Onyx Oil & Chemical, Jersey City; Scholler Bros., Philadelphia; Jacques Wolf & Co., Passaic, N. J.

Rayon Notes

Third general wage increase in the past year has just been granted to Tubize's Hopewell employees . . . Industrial Rayon announced price slashes on Apr. 24 amounting to 10-13c a lb. . . . Marcus Hook plant of Viscose was shut down in April because of labor troubles . . . DuPont Rayon's wage rates are now above the '29 level . . . AAA is studying report on the processing tax for rayon.

Fall Woolens

New interpretations of brown are strongly emphasized in the collection of 46 Fall woolen colors just issued by the Textile Color Card Association to its members in advance swatch form.

Turner E. Rollinson is in charge of dyeing for Peerless Woolen Mills, Rossville, Ga.

Coal Tar Chemicals

Benzol Declines

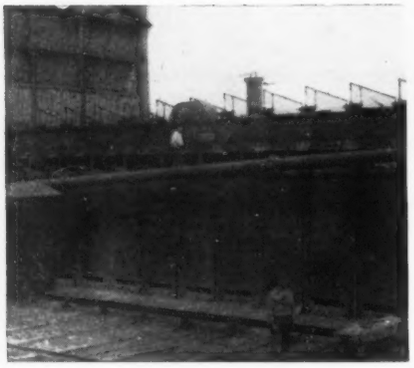
Market for coaltar chemicals was featured last month by a sharp decline in various grades of benzol, the mark-down being 1½c. Decline was attributed to a slowing up of demand in recent weeks and the building up of sizable inventories by consumers. Both grades of cresylic were raised 5c. Demand for toluol was specially heavy, due to the rate of activity in the automotive field. Some let-down was reported in the dye requirements of the textile industry. Phenol shipments were satisfactory.

Important Price Changes

	Apr. 30	Mar. 31
ADVANCED		
Acid cresylic, 95%	$0.55	$0.50
97%	.60	.55
DECLINED		
Benzol, 90% tanks	$0.19	$0.20½
pure, tanks	.19	.20½
nitration, tanks	.20	.21½

Creosote Expansion

American creosote oil industry continues to supply a greater share of domestic needs with a resulting steady decline in imports, according to C. C. Concannon, chief, chemical division, Bureau of Foreign and Domestic Commerce. From '19 to '27, he points out, imports of creosote oil increased each year to a peak of almost 96,000,000 gals. Since '27 imports have declined rapidly, due in part to large domestic installations for the recovery of creosote oil which has enabled American manufacturers to supply an increasing

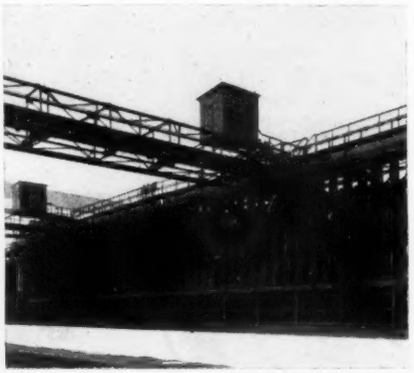


share of domestic requirements. In '33 imports amounted to only 18,588,000 gals., valued at $1,131,450, approximately 11½ million gals. less than in '31 in spite of the low invoice price prevailing throughout the year. In May and June, '33, import prices were as low as 4c per gal., and averaged a little more than 6c per gal. for the whole year. This compares with 16c per gal. in '27, the year when imports began to decline. In '32 more than 105½ million gals. were used by the wood preserving industry, only 20½ million gals. of which were imported. According to a statement just issued by the Chemical Division 5 million gals. were imported during the 1st 2 months of '34, most of which came from the U. K.

U. S. Benzol Trade

U. S. '33 benzol exports totaled 8,439,456 gals., valued at $1,594 075 compared with 3 241 317 gals. valued at $611 656 in '32 according to C. C. Concannon Chief Chemical Division Bureau of Foreign and Domestic Commerce.

Some shifts have occurred in the markets for American benzol Mr. Concannon



Old and the new—Left, first by-products installation in the U. S. at Syracuse—right, a modern plant.

stated. Shipments to the Central and South American area increased 20% compared with '32 Argentina taking 71,000 gals. of a total of 130,000 gals. shipped to that area. Consignments to the Far East practically quadrupled in '33 compared with the preceding year, largest Far East purchaser being Japan which purchased 1,309,000 gals. compared with 374,477 gals. in '32.

European purchases more than doubled, leading countries of destination being France with 4,692,340 gals., U. K., 915,452 gals., and Germany 867,933 gals. Importance of the European market for American benzol, Mr. Concannon pointed out, is apparent from the fact that in '33 approximately 13% of the total American output was sold abroad and of the total American exports 80% was destined to European countries.

U. S. benzol production, estimated from the production of coke at by-product ovens known to recover benzol, amounted to 61,858,000 gals. compared with a production of 45,668,000 gals. recorded for '32, 80% of which entered the motor-fuel field.

Dye Imports

U. S. imports of synthetic dyes increased in February, totaling 335,349 lbs., valued at $472,167. Month's volume compares with 232,078 lbs. in January and 365,144 lbs. in February, '33. This year's imports in the 1st 2 months were about 15% less in volume than those in '33, but totaled almost 21% more in value.

Imports of Synthetic Dyes

	1934		1933	
	Pounds	*Value*	*Pounds*	*Value*
January...	232,078	$349,504	314,878	$311,640
February..	335,349	472,167	365,144	369,829
Totals..	567,427	$821,671	680,022	$681,469

Countries of Origin of Dye Imports

	Percentages February	
	1934	*1933*
Germany	56.80	59.98
Switzerland	42.06	37.28
England	1.09	2.60
All other	.05	.14

Leading Dyes in February Imports

	Pounds
Benzo chrome black blue B	13,375
Vat Printing black B paste	10,300
Trisulphon brown BP	8,173
Indigosol 04B	7,000
Direct chrome black blue B	6,283
Vat brown BR paste, powder, single strength	5,750
Ciba brown G paste	5,027

Ernest Zobel, Brooklyn, has moved to 417 Hamilton ave.

Chemical Formulary Demand

Chemical Formulary Vol. I, latest and most modern book of formulae and recipes for making thousands of commercial products is only 5 months old, having 1st been introduced at the Chemical Exposition. Interest which this work has aroused has been most gratifying. Already over 2,000 copies have been distributed. It is already being used by many manufacturers, sales managers, development executives, colleges, schools, public libraries, and others. Orders have been received from many foreign countries including Japan, China, India, Soviet Russia, Europe, Africa and Australia. The 4th binding is now in process.

Activated Carbon Booklet

Industrial Chemical Sales, 230 Park ave., N. Y. City, has prepared a most complete brochure on the various uses of activated carbon. Those in the sugar, syrup, vegetable, animal oils and fats, water purification, solvents, chemical, and pharmaceutical industries will find this booklet filled with useful information. Copies are available either through the Company or Chemical Industries.

Important Statistics of the Coal Tar Industry

	February 1934	*February 1933*	*January 1934*	*January 1933*	*Total 1933*	*Total 1932*
Coking coal—by-prod. ovens tons	3,644,700	2,370,763	3,621,204	2,580,133	38,682,900	30,887,181
Stocks of coke, by-prod. plants	1,807,802	2,831,248	2,346,617	1,601,000	.....	.....
Coke production, by-prod.	2,493,494	1,638,817	2,475,785	.....	.....	.....
Benzol production, gals	5,545,000	3,688,000	5,442,000	.....	61,858,000	48,065,000
Light oil production, gals	.....	.....	.....	.....	113,727,726	94,514,773
Tar output, gals	35,863,848	21,911,019	35,632,647	23,737,213	380,600,736	784,162,065
Ammonium sulfate prod. tons	42,023	27,821	41,752	.....	446,013	362,461

Paints, Lacquers and Varnish

Few Price Changes

Price adjustments were relatively few in the raw materials. A number of downward revisions were announced in various varnish gums, largely in the Manilas. Higher lead price brought about a ¼c advance in the carlot quotation on both red lead and litharge, but the barrel price in each case remained unchanged. The ¼c advance in pig lead was not reflected back in any price adjustment of orange mineral.

Sale of finished paints, varnish and lacquer showed satisfactory seasonal improvement in April, and further gains are confidently looked for over the next 2 months. It is expected that the Government's action in making available $200,000,000 to homeowners for improvement, maintenance, and repair will help the sale of finished products tremendously in the near future. Building statistics, of both private and public nature, indicate a turn for the better, albeit, a rather modest one.

A geographical breakdown of February construction (including alterations and repairs) together with a comparison for January, follows:—

	Feb. 1934	*Jan. 1934*
New England	$1,490,478	$2,119,590
Middle Atlantic	11,489,299	7,747,657
East North Central	2,621,027	4,543,921
West North Central	1,313,140	1,602,435
South Atlantic	4,705,295	4,919,103
South Central	1,869,804	3,979,465
Mountain and Pacific	4,884,608	4,027,068
Totals	$28,373,651	$28,939,239

It is expected that May automotive production may reach 300,000 units, approximately the industry's activity in March and April.

Against Stock Split-Up

Edward J. Cornish, chairman, National Lead, at the annual meeting of stockholders, vetoed several proposals for split-ups of the common and for the declaration of a large stock dividend. Mr. Cornish said that the proxies he held for the meeting could not be used for any such move and that any proposals should be submitted to stockholders in advance. He gave it as his own position that he was better pleased with the price of the stock as it is than to reduce it by splitting it up.

Mr. Cornish called for a standing vote of the stockholders present in order to secure some idea of their views. Only 5 of the 50 present signified approval either of the split-up or of the 14% stock dividend which was suggested. Company earned between $500,000 and $600,000 in the 1st quarter of the year, compared with a loss for the like period of last year of about $250,000, he stated.

Important Price Changes

ADVANCED

	Apr. 30	Mar. 31
Litharge, com. carlots	$0.06	$0.05¾
Red lead, dry, carlots	.07	.06¾

DECLINED
None

A new basis for the sales of white lead was announced recently by National Lead through Edward J. Cornish, chairman of the board. Company is now making consignments of white lead on contract whereby the customer is not obligated to pay for the shipment until he sells it.

"Most of the lead is sold during April, May and June, and again in the fall," Mr. Cornish stated. "It follows that we will not be able to tell what our white lead business will be until the middle of July."

It was announced that the metals department of the company is now conducting from 44% to over 100% more business.

March Paint, Varnish and Lacquer Sales

Statistics on sales of paint, varnish, and lacquer products, based on data reported to the Bureau of the Census by 586 identical establishments, are presented in the table below, which shows, by months, total volume of sales reported, volume reported by 242 establishments which are unable to classify their sales into trade and industrial, and the volume reported by 344 establsihments which have classified their sales into trade and industrial (paint and varnish, and lacquer).

Year and Month	*Total sales reported by 586 establishments*	*Classified sales reported by 344 establishments*				*Unclassified sales reported by 242 establishments*
		Total	*Industrial sales — Paint and varnish*	*Industrial sales — Lacquer*	*Trade sales of paint, varnish and Lacquer*	
1934						
January	$20,643,659	$6,015,030	$4,290,923	$1,724,107	$7,470,517	$7,158,112
Feb.	17,715,447	5,639,413	3,714,128	1,925,285	6,256,162	5,819,872
March	23,193,396	7,105,176	4,768,864	2,336,312	8,504,997	7,583,223
1933						
Jan.	$11,275,396	$3,529,886	$2,386,947	$1,142,939	$4,168,260	$3,577,250
Feb.	11,665,734	3,423,033	2,445,378	977,655	4,771,706	3,470,995
March	13,578,568	3,391,947	2,484,550	907,397	5,788,213	4,398,408
April	19,043,787	4,677,309	3,143,803	1,533,506	8,582,411	5,784,067
May	26,241,044	5,991,938	4,298,455	1,693,483	11,788,573	8,460,533
June	27,813,233	6,827,509	4,832,551	1,994,958	12,443,998	8,541,726
July	22,090,187	6,406,184	4,493,516	1,912,668	8,627,400	7,056,603
August	20,620,811	6,323,475	4,754,701	1,568,774	7,840,359	6,456,977
Sept.	19,097,803	5,544,686	3,975,917	1,568,769	7,462,113	6,091,004
Oct.	18,944,106	4,949,755	3,721,420	1,228,335	7,376,012	6,618,339
Nov.	16,234,234	4,656,353	3,466,174	1,190,179	6,566,157	5,011,724
Dec.	16,156,062	4,418,023	4,428,376	989,647	6,157,567	5,580,472
Total (Year)	$222,760,965	$60,140,098	$43,431,788	$16,708,310	$91,572,769	$71,048,098
1932						
Jan.	15,894,506					
Feb.	16,270,822					
March	19,089,005	(a)	(a)	(a)	(a)	(a)
April	22,612,193					
May	24,981,441					
June	19,637,358	4,685,399	3,617,719	1,067,680	8,734,330	6,217,629
July	14,430,122	3.793,245	2,900,707	892,538	6,058,813	4,578,064
Aug.	16,032,441	3,851,028	3,057,096	793,932	6,918,659	5,262,754
Sept.	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
Oct.	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
Nov.	12,492,818	3,599,319	2,639,362	959,957	5,196,766	3,696,733
Dec.	9,484,520	3,222,770	2,186,706	1,036,064	3,506,715	2,755,035
Total (Year)	$203,323,315	.....	.....	.....	.....	.....

(a) Comparable statistics not available.

Rosin-Turpentine Export Figures (April-February)

Country	*Season — Rosin† '33-'34*	*'32-'33*	*'31-'32*	*'30-'31*	*Season — Turpentine '33-'34*	*'32-'33*	*'31-'32*	*'30-'31*
U. K.	247,062	199,844	227,418	259,270	123,666	89,268	95,695	153,574
Germany	182,182	237,061	203,248	215,794	45,489	30,804	34,169	33,028
Italy	39,289	36,207	32,185	34,047	1,211	2,909	1,508	
Netherlands	90,680	88,782	66,757	72,025	52,631	40,512	42,432	42,599
Belgium	26,760	22,417	18,719	25,191	13,179	9,970	17,220	25,866
Norway	10,338	11,846	8,914	12,456	.....	.....	.....	.....
Sweden	29,752	24,321	23,097	31,322	.....	.....	.....	.....
S. America	160,569	169,899	177,617	209,179	7,590	7,628	10,764	13,023
Japan	74,156	77,597	116,967	85,387	1,153	782	1,915	1,400
Dutch E. I.	67,750	43,020	44,852	55,355	.....	.....	.....	.....
Aust. & N. Z.	17,956	10,090	13,074	14,009	12,267	10,221	11,812	10,180
Canada	50,112	40,122	45,839	49,800	19,397	16,670	19,510	23,010
Cuba	14,731	12,734	17,334	16,340	474	436	463	727
Europe	674,384	626,905	591,504	665,446	240,482	176,751	192,179	256,265
Total outside of Europe	436,253	384,888	447,453	466,855	45,451	40,231	49,534	53,242
Total	1,110,637	1,011,793	1,038,957	1,132,301	286,023	216,982	241,713	309,507

†in bbls. of 500 lbs. gum and wood rosin. Exports for the past month may be found by subtracting figures given on page 352 of CHEMICAL INDUSTRIES, (April number) from the figures above; above figures include gum and wood rosin.

Naval Stores Receipts, Production, Stocks, Exports

Item	*Receipts* — Total '33-'34	Total '32-'33	April 1934	March 1934	*Estimated Production* — Total '33-'34	Total '32-'33	March 1934	Feb. 1934	*Stocks†* — '33-'34 Mar. 31	'32-'33 Mar. 31	April 1934	Feb. 1934	*Exports* — '33-'34	'32-'33	March '34
Turpentine, gum bbl. (50 gal.)	258,208	224,313	17,284	6,352	450,000	390,000	.....	.....	46,010	63,679	46,608	54,138	281,169	212,780	12,535
Turpentine, wood bbl. (50 gal.)	.....	.....	....	....	78,760	.....	7,279	7,892	19,253	12,387	....	17,859	19,030	12,276	1,641
Rosin, gum bbl. (500 lbs.)	1,009,402	865,733	68,164	51,978	1,500,000	1,300,000	37,787	.....	142,574	237,350	156,114	152,569	968,736	910,214	64,824
Rosin, wood bbl. (500 lbs.)	.....	.....	....	....	486,888	.....	43,753	46,016	89,963	98,615	....	86,492	230,899	179,080	24,174
Pine oil gal.	.....	.....	....	....	.....	.....	295,589	306,375	3,130,393	.....	....	.....	.....	.....	...

*3 ports, Savannah, Jacksonville, Pensacola; †for gum turpentine and gum rosin this figure represents stocks, 3 ports.

National Clean Up and Paint Up Campaign Bureau is in close contact with the government agencies which are planning to put the full strength of the government back of a mighty Clean Up—Paint Up—Fix Up—Modernize drive which is expected to be announced almost immediately, in a vigorous effort to bring about rehabilitation of property for the stimulation of movement in capital goods and the construction industry. Bureau's plans and service have been placed in the hands of the National Emergency Council, the Executive Council, and other government agencies interested in rehabilitation of property.

An illustrated list of Clean Up and Paint Up display material may be obtained by sending a request to the National Clean Up and Paint Up Campaign Bureau, 2201 N. Y. Ave., N. W., Washington, D. C.

Statistics of the Jacksonville, Savannah, Pensacola Markets

Grade	Close Mar. 31	Apr. 7	Apr. 14	Apr. 21	Apr. 28	Close Apr. 30	Net Gain or Loss for Month	Same Time Last Year (Apr. 28)	Net Gain or Loss from Last Year
B	$4.25–4.35	$4.35	$4.30	$4.40	$4.25	$4.25	...	$2.50	+$2.75
D	4.40–4.60	4.75	4.50	4.50	4.45	4.40	...	2.55	+ 1.85
E	4.85–4.90	5.00	4.90	4.70–4.80	4.65	4.60–4.70	—.15	2.95	+ 1.65
F	5.10–5.15	5.25	5.15	4.95	4.85	4.80	—.30	3.20	+ 1.60
G	5.15	5.25	5.15	4.95–5.00	4.90	4.85	—.30	3.20	+ 1.65
H	5.15	5.25	5.25	5.05	4.95	4.90	—.25	3.25	+ 1.65
I	5.15	5.27½	5.25–5.30	5.15–5.20	5.15	5.15	...	3.30	+ 1.85
K	5.15	5.27½	5.25–5.35	5.20–5.30	5.20	5.15–5.20	...	3.50	+ 1.65
M	5.15	5.27½	5.25–5.35	5.20–5.30	5.20	5.20	+.05	3.55	+ 1.65
N	5.20–5.30	5.27½	5.25–5.35	5.30	5.25	5.20–5.25	...	3.75	+ 1.45
W.G	5.20	5.27½	5.25–5.35	5.30	5.25	5.20–5.25	...	3.95	+ 1.25
W.W	5.35	5.45	5.25–5.35	5.35	5.27½–5.30	5.30	—.05	4.25	+ 1.05
X	5.35	5.45	5.40	5.35	5.27½–5.35	5.30	—.05	4.25	+ 1.05
Market	Firm	Firm	Firm	Firm	Firm	Firm		Firm	
Turpentine									
Price	56–56½c	54¼c*a*	56¼c	53¼c	52c	51½c	—.4½c	40½c	+11c
Market	Firm	Firm	Firm	Firm	Firm	Firm			

*a*Firm bid and refused.

Week Ending	Spirits Receipts	Spirits Shipments	Rosin Receipts	Rosin Shipments	Same as Last Year: Spirits Receipts	Same as Last Year: Spirits Shipments	Same as Last Year: Rosin Receipts	Same as Last Year: Rosin Shipments
April 7	1,112	832	5,088	7,836	1,473	2,973	5,873	14,320
April 14	1,465	332	6,563	8,754	1,951	714	6,936	8,308
April 21	1,975	1,797	7,742	6,475	1,802	979	6,155	10,235
April 28	1,981	1,373	7,329	4,510	2,347	2,730	8,138	8,895
April 30	694	128	1,476	224	.....	.....	.....	.....
Total for Month	7,227	4,462	28,198	27,799	.....	.....	.....	.....
Since Apr. 1, '34	.....	4,334	.....	27,575	.....	7,398	.....	41,778
Foreign*	.....	2,885	.....	16,351	.....	4,255	.....	27,796
Domestic*	.....	1,449	.....	11,224	.....	3,143	.....	13,982

*Figures for Apr. 1-28th exclusively.

Stocks	Spirits	Rosin	Same as Last Year: Spirits	Same as Last Year: Rosin
April 1	21,047	61,212	36,712	116,429
April 30	23,813	62,890	.....	.....
Loss or Gain in stocks in past month	+2,766	+1,678	.....	.....

(Savannah) Grade	Close Mar. 31	Apr. 7	Apr. 14	Apr. 21	Apr. 28	Close Apr. 30	Net Gain or Loss for Month	Average Price for April Last Year	Net Gain or Loss from Aver. Price Last Year
B	$4.35	$4.30	$4.30	$4.25–4.40	$4.25	$4.45	+$0.10	$2.02½	+$2.43½
D	4.60	4.50	4.50	4.50	4.40	4.60	....	2.12½	+ 2.47½
E	4.90	4.80	4.90	4.70–4.75	4.65	4.75	—.15	2.52½	+ 2.23½
F	5.15	5.15	5.15	4.95	4.84	4.85	—.30	2.72½	+ 2.13½
G	5.15	5.15	5.15	4.95–5.00	4.90	4.90	—.25	2.72½	+ 2.17½
H	5.15	5.15	5.25	5.05–5.10	4.95	4.95	—.20	2.75	+ 2.20
I	5.15	5.15	5.25	5.10–5.15	5.10	5.00	—.15	2.77½	+ 2.22½
K	5.15	5.15	5.25	5.15–5.20	5.15	5.15	....	3.07½	+ 2.07½
M	5.15	5.15	5.25	5.15–5.20	5.20	5.25	+.10	3.10	+ 2.15
N	5.20	5.15	5.25	5.20–5.25	5.25	5.25	+.05	3.37½	+ 1.87½
W.G	5.20	5.15	5.25	5.20–5.25	5.25	5.30	+.10	3.47½	+ 1.82½
W.W	5.25	4.25	5.25	5.30–5.40	5.30	5.35	+.10	3.62½	+ 1.72½
X	5.25	4.25	5.25	5.30–5.40	5.35	5.35	+.10	3.65	+ 1.70
Market	Firm	Firm	Firm	Firm	Firm	Firm			
Price of Turp.	56c	54c	54½c	53c	52½c	51½c	—.4¾	40¼*a*	+11c
Market	Firm	Firm	Firm	Firm	Firm	Firm			

Highest turpentine price quoted Savannah Apr. 1, 1920 at $2.33 a gal; lowest Sept. 4, 1896 at 22c. *a*Price on Apr. 28, 1933

Week Ending	Spirits Receipts	Spirits Sales	Rosin Receipts	Rosin Sales	Same as Last Year: Spirits Receipts	Same as Last Year: Spirits Sales	Same as Last Year: Rosin Receipts	Same as Last Year: Rosin Sales
April 1–7	1,376	277	6,617	2,374	1,579		5,673	
April 7–14	1,361	238	6,409	1,775	2,201		7,714	
April 14–21	2,257	452	10,459	5,102	2,271		7,579	
April 21-28	2,382	828	9,347	5,679	1,893		6,969	
April 30	713	291	1,579	887				
Total for Month	8,089	2,086	34,411	15,817				

Stocks	Spirits	Rosin	Spirits	Rosin
March 31	5,295	74,691	8,063	111,563
April 30	5,059	83,903		
Loss or Gain in stocks in past month	—236	+9,212		

Week Ending (Pensacola)	Turpentine Receipts	Turpentine Shipments	Turpentine Stocks	Rosin Receipts	Rosin Shipments	Rosin Stocks
March 31	206	861	19,668	597	570	6,671
April 6	260	610	19,318	726	209	7,188
April 13	436	1,409	18,345	1,211	833	7,566
April 20	506	807	18,044	1,377	305	8,638
April 27	560	838	17,736	1,644	1,178	9,321
Stocks Apr. 1, '34	...	....	19,668	....	....	6,671
Net loss or gain in stocks past month*	...	....	–1,932	....	...	+2,650

*To April 28th.

London Naval Stores Market

Week Ending	Rosin Weekly Common	Rosin High—Low W. W. Grade	Turpentine Weekly High—Low	American Turpentine Stocks 1934	American Turpentine Stocks 1933
Close March 29*		16s 9d	51s	12,819	
April 6	15s 9d	16s 9d	51s 3d—50s 6d	12,810	8,853
April 13	15s 9d	16s 9d	51s 6d—50s 9d	12,369	7,621
April 20	15s 9d	16s 9d	51s 6d—50s 3d	11,780	10,600
April 27	15s 9d—15s 6d	16s 9d	50s 3d—48s 9d	10,696	5,427
Close Apr. 30	15s 6d	16s 9d	48s 9d	9,155†	5,364†

*Last trading day of the month, †Stocks on May 4th.

Wholesale Paint Group

National Wholesale Paint Association, through its president, A. F. Winsell, Cincinnati, has submitted proposed code of fair competition for the wholesale paint, varnish, lacquer, allied and kindred products industry.

Supplemental to general code for wholesaling or distributing trade, tentative draft presented provides for the establishment of a separate code authority and sets up a list of trade practice regulations.

Mr. Winsell offered a number of clarifying amendments covering definitions of the trade and trade practice provisions which would cover terms of sale on spring and fall stock orders and new accounts. A list of merchandise specifying articles to be included under the term "allied and (or) kindred products" was also submitted.

Witnesses voicing objections to the proposed code included W. R. Winslow of the W. R. Winslow Co. of Washington, who protested against the definition of "trade sales," and Lewis F. Edwards, president Metropolitan Refining, L. I. City.

Paint Recovery Board Meets

Paint Industry Recovery Board under Chairman Trigg and National Industrial Sales Committee held a 3-day meeting Apr. 11-13 in Chicago. Board voted to incorporate Code Authority and appointed M. Q. MacDonald, N. P. V. & L. A. counsel, as general counsel.

Kennedy Succeeds Esposito

Paul S. Kennedy has taken over the chairmanship of the National Industrial Sales committee of N. P. V. & L. A., recently vacated by Ault & Wiborg's Joseph R. Esposito. Latter remains as a committee member. An active program was recently formulated at a Washington meeting.

With The Paint Associations

Spencer Kellogg's technical director, Dr. Alexander Schwarcman, and J. M. Schantz, Hercules' naval stores dept., shared places on the Philadelphia Paint & Varnish Production Club's April meeting . . . President Trigg spoke in Baltimore Apr. 4 on code matters . . . Louisville's Production Club heard Dr. Henry A. Gardner, director of Paint & Varnish Institute, on May 3 . . . Chicago production group entertained C. A. Klebsattel,

Advance Solvents and Dr. Otto Jordan, I. G. paint expert, at its April meeting.

Paint Personnel Changes

Kenneth J. Keating, well-known paint technologist, has succeeded F. N. Macgregor at General Paint's Tulsa plant. Mr. Macgregor is now lacquer chemist for Arco at Cleveland . . . A. J. Browning, formerly Peninsular Paint & Varnish's general manager, is now in charge of Montgomery, Ward's paint activities. Peninsular is a subsidiary of Acme White Lead . . . J. S. Williams has been added to McCloskey Varnish's eastern sales division . . . H. Vernon Smith, superintendent of McDougall-Butler's paint, varnish, and lacquer plant at Buffalo, has been made technical director . . . Walter G. Patton has been made general traffic manager for St. Joseph Lead, with offices at 250 Park ave., N. Y. City.

Coast Visitors

Kentucky Chemical's chemical director, Carl A. Henlein, is on the Coast with Edgar S. Browning who represents Kentucky in that section . . . H. E. Brown, N. J. Zinc, is another Coast visitor. George Anderson, Anaconda, was out West in April also . . . Commercial Solvents' assistant sales manager, O. R. Brunkow, was in Chicago part of last month.

Beck, Koller Convention

Beck, Koller's sales representatives were welcomed in Detroit, Apr. 13 by President Reichhold (just back from a 3-weeks European round trip) and later heard Technical Director, Dr. Wilhelm Krumbhaar. Marshall Dill, San Francisco, also spoke.

Visits U. S.

I. G.'s paint and varnish expert, Dr. Otto Jordan, is in this country visiting with Vice-President Mullaly, Advance Solvents. Dr. Jordan edited "The Chemical Technology of the Solvents."

Bureau of Chemistry & Soils has succeeded in isolating 2 constituents of the natural wax of apple skins. Ursolic acid imparts hardness to lacquers and nonacosane increases impermeability. American Cyanamid has applied for a patent on a method of recovering ursolic acids and Celanese Corp. has an application covering the use of nonacosane in lacquers to increase impermeability.

Senn Appointed

George H. Senn, Philadelphia Bourse, Philadelphia, has been appointed distributor for Metro-Nite Co., and the Michigan Quartz Silica Co., manufacturers of a complete line of extender pigments, fillers and double air floated silica.

Eagle-Picher Lead's Pittsburgh offices have been moved from 49-52 Terminal Way, S. S., to 1713 Liverpool st., N. S. Telephone number is Fairfax 2177.

H. B. Fleming has leased plant of the Factory Consumers Paint, Buffalo, and will start production.

Berry Bros. has shipped a carload of finished materials to Brazil.

Linseed Prices Off Slightly

Linseed prices moved within very narrow limits in the principal sales centers. In a number of instances some shading was in evidence from the quoted levels, but generally the market continued to indicate firmness despite rather routine buying. Flaxseed prices in domestic primary centers showed net gains for the month.

One authority on flax advises that the outlook at the present time is for a considerable increase in flax acreage over the "Intentions to plant" of 1,559,000 acres;—if planting conditions continue favorable, this year's acreage may surpass the 1,755,000 acres planted last year.

As to Canada, their moisture conditions are better than normal for this time of the year; however, frequent and ample rains will be required on both sides of the International Line during the growing season. Then, of course, also there is the menace of grasshopper damage later on.

According to Broomhall's figures balance available for shipment for the next 37 weeks of 23,688,000 bu., compared with about 31,000,000 for the similar period last year. Therefore, remaining stocks on the farms must be small relatively. Latest advices from Argentina indicate that they have had abundant rainfall and their soil is in good condition for seeding operations; this will have a tendency towards increasing flaxseed acreage but with the Government intending to maintain their minimum guaranteed prices for wheat, farmers may be influenced to in-

Domestic Flaxseed Receipts by Weeks

	—April 6—		—April 13—		—April 20—		—April 28—	
Week Ending	*1934*	*1933*	*1934*	*1933*	*1934*	*1933*	*1934*	*1933*
Minneapolis cars	13	17	16	24	27	24	48	57
Duluth cars	10	8	3	7	9	19	0	16
Winnipeg cars	5	47	2	33	5	30	7	33
Totals to date this crop*	3,476	7,245	3,497	7,309	3,538	7,382	3,593	7,488

*Aug. 1

Minneapolis Linseed Oil and Meal Shipments

	—Oil in Pounds—		—Meal in Pounds—	
Week Ending	*1934*	*1933*	*1934*	*1933*
April 6	843,629	1,453,653	2,749,790	2,126,868
April 13	818,052	1,674,989	1,138,600	1,938,886
April 20	1,147,458	2,000,586	1,094,235	2,818,130
April 27	870,701	2,519,291	1,014,782	2,263,318
Totals to date	21,363,363	36,806,816	66,807,902	75,230,699

Flaxseed Prices in Primary Centers

	—Minneapolis—			—Duluth—			—Winnipeg—			Buenos Aires
Week Ending	*Cash*	*May*	*July*	*Cash*	*May*	*July*	*Cash*	*May*	*July*	*1934*	*1933*
Close Mar. 31	1.76¾	1.72¾*	1.74¾*	1.75¾	1.75¾	1.76¼†	1.53⅜	1.54⅜	1.55	1.04¾	.57⅜
April 6	1.76	1.72	1.74½	1.77	1.77	1.78	1.54	1.55	1.54½	1.06⅝	.58⅞
April 13	1.77	1.73	1.75½	1.75½	1.75½	1.77	1.52¾	1.53¾	1.53⅜	1.08½	Hol.
April 20	1.80½	1.74½	1.76½	1.77	1.77	1.78	1.46½	1.46¾	1.47¾	1.08⅜	.67¼
April 27	1.84¼	1.78¼	1.81	1.82½	1.82½	1.83½	1.48⅝	1.48¾	1.50¼	1.12¼	.70⅜
Close April 30	1.83½	1.85½		1.86¾	1.88½		1.46¾	1.47¾	1.15⅛	
Net loss or gain past month	+.10¾	+.10¾		+.11			−.07⅝	−.07¼	+.10⅜	

†Asked; *Bid.

Linseed Oil Prices, Minneapolis, London, San Francisco & Chicago

	Minneapolis		London Weekly High-Low*		San Francisco		Chicago		N. Y. City	
Week Ending	*Carlots*	*Tanks*	*High*	*Low*	*Carlots*	*Tanks*	*Carlots*	*Tanks*	*Carlots*	*Tanks*
Close Mar. 31	9.5c	8.9c	17s 7½d		9.7c	9.1c	9.5c	8.8c	9.3c	8.7c
April 6	9.5	8.9	17s 7½d		9.6	9.0	9.4	8.8	9.3	8.7
April 13	9.5	8.9	18s	17s 10½d	9.6	9.0	9.4	8.8	9.3	8.7
April 20	9.3	8.7	18s 4½d	17s 6d	9.4	8.8	9.3	8.7	9.3	8.7
April 27	9.3	8.7	18s 10½d	18s 4½d	9.4	8.8	9.3	8.7	9.3	8.7
Close April 30	9.3	8.7	19s 4½d		9.4	8.8	9.3	8.7	9.3	8.7
Net gain or loss past month	−.2	−.2	+1s 9d			−.3	−.2	−.1	...	....

*Per cwt.

Indian and Buenos Aires Flaxseed Shipments, Stocks

	—Exports in Bushels*—				—Same Week Last Year*—				Since Apr. 1, 1934*		Since Apr. 1, 1933*			
Week Ending (Indian)	*U. K.*	*Cont.*	*Others*	*Total*	*U. K.*	*Cont.*	*Others*	*Total*	*U. K.*	*Cont.*	*Others*	*U. K.*	*Cont.*	*Others*	*Total* *1934*	*Total* *1933*
April 6	4	..	666	670	8	44	5	52	...	..	...	...	...	...	....	....
April 13	272	56	24	352	100	104	40	244	276	56	684	108	148	40	1,016	296
April 20	52	24	80	156	8	..	..	8	328	80	764	116	148	40	1,172	304
April 27	52	..	..	52	60	24	..	84	380	80	764	176	172	40	1,224	388

*000 omitted.

	—Exports in Bushels*—					—Total*—		—Since January 1*—					—Total*—		Visible Supply*	
Week Ending (Buenos Aires)	*U. S.*	*U. K.*	*Cont.*	*Orders*	*Others*	*1934*	*Same Week '33*	*U. S.*	*U. K.*	*Cont.*	*Orders*	*Others*	*1934*	*1933*	*1934*	*1933*
April 6	169	8	264	606	389	1,436	1,316	3,453	279	7,048	12,366	839	23,985	23,219	7,480	7,283
April 13	173	..	516	677	...	1,366	417	3,626	279	7,564	13,143	839	25,451	23,636	7,087	7,480
April 20	256	12	339	827	24	1,458	834	3,882	291	7,903	13,970	863	26,909	24,470	7,078	6,693
April 27	287	4	642	55	43	1,031	1,036	4,169	295	8,545	14,025	906	27,940	25,506	6,693	6,693

*000 omitted.

crease the acreage of wheat at the expense of linseed.

The linseed code is now effective, having been signed by the President late in April.

Turpentine Price Sags

First month of the new naval stores industry year ushered in very little change in either prices or conditions (this does not apply to turpentine, however, which showed a decided decline). Net price gains or losses in the various grades of gum rosin, as indicated in the accompanying statistics, were very small. Purchasing for both domestic and foreign consumption was somewhat disappointing in the primary centers. Stocks in the 3 Southern market centers as the month closed were much smaller than at the same period a year ago despite rather large receipts. As the month closed wood rosin producers were quoting $4.90 against $5.10 on Mar. 30. A new set of statistics are added in this issue to the naval stores industry group, showing production, stocks, exports, etc. of gum turpentine, gum rosin, wood turpentine, wood rosin and pine oil, affording a more complete statistical picture of the 3 primary ports and the wood producing group.*

Turpentine In Tins

Columbia Naval Stores has erected a large corrugated tin building in the Savannah Atlantic Coast Line railroad terminals, which will serve as a plant for the filling and shipping of turpentine in tin cans for smaller consumers. Building is modernly equipped with large tanks and floor space to handle this end of the naval stores business.

J. E. Dykes, 87, a well-known naval stores operator, but in retirement for several years, died recently at his home in Moultrie, Ga.

A survey of the naval stores resources of the Southeast is about to be undertaken by the Southeastern Forest Experiment Station.

Solvents

Haskell—Now U. S. I. Director

Glenn Haskell, well-known figure in the chemical industry, was elected a director of U. S. I. at the annual meeting. Mr. Haskell, who succeeds J. H. White, Jr., is a vice-president of the company, head of the Industrial Alcohol Institute and a member of the supplemental code committee of the Chemical Alliance.

Important Price Changes

ADVANCED

	Apr. 30	Mar. 31
Methanol, denat. grade, tanks	$0.43	$0.40
drums	.48	.45
drums, l.c.l.	.51	.48

DECLINED

None

No Alcohol Tax Rebate

Despite efforts of Senator Shipstead (Minn.) and others the chance of obtaining a rebate or repayment of 90c a gal. on alcohol used for non-beverage purposes is reported from Washington to be very slight. On Apr. 25th the amendment was rejected by the House Committee.

Japanese Butyl Alcohol

Nihon Yogai Hogy K. K. (Japanese Solvents Manufacturing Co.) has recently been formed with a capital of 600,000 yen. Firm plans to manufacture approximately 400 tons of butyl alcohol and 220 tons of acetone a year from beet molasses.

Gums, Waxes, Shellac

Shellac Prices Off

After showing some weakness in the 1st part of the month London and Calcutta markets firmed up and foreign quotations advanced sharply. It was thought that the London Syndicate was again active. Stocks of shellac in London were reported at 171,406 packages on Apr. 1, thought to be a record, or close to it. Domestic quotations on various grades were lowered in the 3rd week on bone dry after a decline in T. N. and superfine in the week previously. Actual demand was very light on the part of consumers, but considering the sudden upward turn in the foreign markets at the turn of the month causing higher replacement costs, those close to the market felt that a firmer tendency in domestic quotations in the near future was quite likely.

Gum Market Slow

Path of the gum market in the past month was largely downward with trading limited mostly to spot purchasing in only moderate sized quantities. More important price changes are given in "Important Price Changes."

Important Price Changes

ADVANCED

	Apr. 30	Mar. 31
None		

DECLINED

Camphor, slabs	$0.53	$0.54
powder	.53	.54
Copal East India black nubs and chips	.04⅜	.04¾
Manila, Loba A	.11⅜	.12¼
Loba C	.09⅞	.10½
Loba CBB	.08⅞	.09⅜
Loba D	.08¾	.09⅛
Loba DBB	.08½	.08¾
Loba DU	.08½	.08¾
Mastic	.36½	.37¼
Pontianak chips	.07⅝	.08
Sandarac	.46	.48
Yacca	.03¼	.04

Wax Prices Weak

Wax market was rather a routine affair in the past 4 weeks. Buyers appeared to be willing to "play along with the market" holding down purchasing to small quantities for the time being. A slightly easier tendency was noted in No. 1 and No. 2 carnauba yellows and in the Brazilian and African grades of beeswax. Camphor prices showed a net loss for the 30 day period.

Important Price Changes

ADVANCED

	Apr. 30	Mar. 31
None		

DECLINED

Beeswax, Chilean	$0.21½	$0.22
Brazilian	.21½	.22
Carnauba, No. 1 yellow	.33	.35
No. 2 yellow	.32	.32½

New Lenoir Representative

Frederick D. Keller, 150 Nassau st., N. Y. City, now represents Gilbert Lenoir, Belgium, on gums.

Metals

Research looking toward improving quality of copper alloy castings is being sponsored by the Falcon Bronze, Youngstown, Ohio. Project will be conducted at Battelle Memorial Institute, Columbus, Ohio, by C. H. Lorig.

New Cerium Source

American Treibach Chemical Works, Inc., manufacturer of metallic cerium and

Shellac Prices, Weekly High-Low

	London		*Calcutta*		*N. Y. City*					*Shellac Varnish, N. Y. City*					
			U. S. in c. Close of week		*T.N.C.&F.*	*Bone Dry*				*Orange*			*White*		
Week Ending	*May High-Low*	*Aug. High-Low*	*May*	*Aug.*	*N. Y.†*	*10 bbls.*	*5-9 bbls.*	*1-4 bbls.*	*T. N.*	*Superfine*	*Garnet*	*5 lb. cut*	*4½ lb. cut*	*4 lb. cut*	*5 lb. cut*	*4½ lb. cut*	*4 lb. cut*
Close Mar. 29.	87½s	87½s	18.9c	18.9c	16½c	29c	30c	31c	21-23¾c	23-23¾c	24-25	$1.20	1.15	$1.10	$1.45	$1.40	$1.35
Apr. 6	87s 6d-85s	87s 6d-86s 6d	18.4	17.8	16	29	30	31	20-22½	23-23¾	24-25	1.20	1.15	1.10	1.45	1.40	1.35
Apr. 13	87s-84s	89s-86s	18.2	18.6	15¾	29	30	31	20-22½	23-23¾	24-25	1.20	1.15	1.10	1.45	1.40	1.35
Apr. 20	92s 6d-83s 6d	95s 6d-86s	19.9	20.6	18	26	27	28	20-22½	22-23	23-24	1.10	1.05	1.00	1.30	1.25	1.20
Apr. 27	97s 6d-92s	101s-95s	21.1	21.9	18½	26	27	28	20-22½	22-23	23-24	1.10	1.05	1.00	1.30	1.25	1.20
Close Apr. 30	94s	103s			19¼	26	27	28	21-22	23-24	24-25	1.10	1.05	1.00	1.30	1.25	1.20

†per cwt.

*See pages 447, 448 for naval stores statistics.

products of the rare metal fields, will establish a branch plant at Niagara Falls.

Local plant will serve as an experimental works for the Treibacher Chemisch Works of Treibach, Austria. U. S. concern is controlled by the Welsbach family, whose founder, Dr. Carl Auer von Welsbach, invented the Welsbach lamp. American firm plans construction of a new plant here within a year or so. Ultimate aim of the company is to manufacture radium.

Tin quotas have increased 10% for 6 months—equivalent of 8,280 tons.

Chemical Specialties

New Specialties

Stonhard Co., 401 N. Broad st., Philadelphia, is producing a new type of floor cleaner in crystalline form, odorless and easily dissolved in water. "Stonhard Stonflush" is the trade name . . . Bart Products, Bartlesville, Okla., is producing "Safe-T-Glos" a new glass and metal cleaner with a neutral reaction . . . Armour Soap is introducing "Arcolene" a new paste-type dry cleaning soap . . . American Chemical Products, Des Moines, has a new line of cattle and household sprays . . . "Mirpo" is a new silver polish made by Mirpo Polish, La Porte, Ind. . . Shinola-Bixby, N. Y. City, has brought out a "Tuxedo" cleaner for white shoes . . . Thibaut & Walker, L. I. City, has brought out a new varnish "Mop-It-On" that needs no brush . . . Automotive Laboratories, Bannister, Mich., is placing "H-K-S Stop Rust"—a new conditioner for automotive cooling systems—on the market . . . Eazo Corp., N. Y. City, is now marketing a packaged cleaner—"Eazo" . . . Whittemore Bros., Boston, has a new white shoe cleaner—"Shuclean" . . . O'Cedar Corp. is putting out "So-Ezy Slip-On Mop and Polish" . . . Reardon Color & Chemical Wks., Cincinnati, has announced a wool from stone for use in insulation of old and new houses.

Specialty Notes

Michigan Alkali has appointed Exterminating Materials, N. Y. City, as a distributor for "Malium," the new, non-poisonous fumigant . . . West Disinfecting has secured a preliminary injunction against Philip Nussbaum, doing business as French Chemical Necessities, N. Y. City, to restrain defendant from the manufacture and sale of disinfectants under the trade-mark "ZN." Grant A. Dorland, *Soap*, is in general charge of entertainment at the semi-annual meeting of the National Association of Insecticide and Disinfectant Manufacturers at the Edgewater Beach Hotel, Chicago, June 11-12 . . . A splendid program of papers has been arranged for the business sessions . . . The Agricultural Insecticide and Fungicide Association has proposed that the code for the industry be made a division of the Chemical Alliance Code . . . Mid-West Laboratories is using the radio to stimulate sales of moth-proofing compounds . . . "Kitchen Klenzer" and "Automatic Soap Flakes," both products of Fitzpatrick Bros., Chicago, have placed their advertising with the Chicago office of Neisser-Meryerhoff.

In the Soap Field

E. C. Price, former M. Werk & Co. president, is now head of Duratone, Inc., which is now marketing "Duratone"— a "soapless soap"—to laundries . . . Gem Products, Camden, N. J. maker of a bleaching, bluing and washing product, has placed its advertising with Paris & Peart, N. Y. City . . . Richards Chemical's dry cleaning division (Jersey City, N. J.) has appointed Parker Advertising, Dayton, to handle advertising and promotion . . . N. N. Dalton, a former Colgate-Palmolive-Peet vice-president, is now director of research for the Glycerine Producers Association . . . "Sweetheart Flakes" are now being marketed by Manhattan Soap in 21-oz. packages.

Agricultural Insecticide Code

NRA Administrator Johnson on May 2 signed the code for the agricultural insecticide and fungicide industry.

Code, which is a supplement to the approved code for the chemical manufacturing industry, becomes effective May 11, subject to an indefinite stay of provisions calling for a waiting period between the time of filing revised price lists and their effective date. Labor provisions of the basic chemical code are incorporated, by reference, bodily in this supplemental code, which is concerned principally with the establishment of rules of fair trade practice to govern the industry.

An unusual provision is one requiring jobbers of the industry to observe certain of these trade practice rules relating to such subjects as free experimental goods, secret rebates, consignments and price guarantees. This provision, which is regarded as essential by the industry, will remain in force only for a period of 6 months unless its life is extended by the Administrator. Reprocessing, or mixing,

Production, Shipments, Stocks of the Metals

	March 1934†	*March 1933†*	*February 1934†*	*February 1933†*	*January 1934†*	*January 1933†*
Copper Production, U. S.*a*	27,500	.....	27,000	.....	18,000	.....
Foreign	68,500	.....	67,000	.....	56,000	60,000
World total	104,500	.....	87,000	.....	91,000	.....
Copper Deliveries, U. S.	42,500	.....	37,000	.....	32,500	.....
Foreign	84,500	.....	68,500	.....	66,500	.....
World total	117,000	.....	105,500	.....	97,500	.....
Copper World Stocks	591,000	.....	612,500	.....	.....	.....
Copper American Stocks	494,000	.....	511,500	.....	.....	.....
Lead Production, U. S.	35,502	26,469	34,349	22,410	38,570	.....
World total	.....	.....	.....	.....	122,724	105,262
Lead stocks as month closed	221,391	194,251	216,224	189,751	207,674	.....
Lead, domestic shipments	30,321	21,950	25,778	17,349	33,911	.....
Zinc Production, U. S.	33,721	.....	30,172	19,661	32,954	18,867
World total	109,884	83,950	97,074	76,619	105,782	79,222
U. S. shipments, slab zinc	32,753	15,869	32,054	14,865	26,532	15,162
U. S. zinc, unfilled orders	21,976	8,581	26,676	8,562	26,717	6,313
Zinc stocks, U. S.	110,761	139,296	109,793	133,357	111,982	128,561
Zinc stocks, cartel	136,485	.....	147,936	.....	154,203	.....
U. S. retorts oper. end of period	26,952	22,375	30,763	23,389	28,744	22,660
Silver Production, U. S.*	2,791	2,574	1,903	1,603	2,025	1,960
World total*	14,965	14,895	13,368	12,949	14,700	.....
Refiners' stocks of silver	10,645	.....	8,919	.....	7,275	.....
Tin shipments from cartel countries	6,946	.....	6,268	.....	.....	.....
World tin visible supply‡	20,423‡	.....	21,694	43,160	22,476	.....
U. S. tin stocks end of month*	.....	.....	7,014	2,741	8,209	.....

*In oz., 000 omitted; ‡long tons; †in tons; *a* '33 world copper production 902,000 long tons, against 870,000 tons in '32, a gain of 4%. World copper consumption gained 16½%—1,125,000 tons against 965,000 tons; ‡Visible supply end of April, 17,704 tons.

PRICES

Week Ending	*Lead Weekly, High-Low— E. St. Louis*	*N. Y.*	*London per ton*	*Zinc Weekly, High-Low— E. St. Louis*	*N. Y.*	*London per ton*	*Copper Weekly High-Low Conn. Valley*	*Tin Weekly — Straits*	*Standard*	*Silver Bullion Weekly, N. Y.*	*London (pence)*	*Mercury Weekly High-Low N. Y., flask*
Close Mar. 31	.0390¢	.040¢	£11 12s 6d	.0430¢	.0465¢	£15 2s 6d	8c	55.25¢	54.60¢	45½¢	19⅝	$76
Apr. 6	.0390	.040	£11 11s 3d-£11 7s 6d	.0435-.0430	.0472-.0465	£15-£14 13s 9d	8c	56.70-55.25	56.45-55.10	46¼-45½	20 -19⅛	76
Apr. 13	.0410-.0390	.0425-.0400	£11 11s 3d-£11 7s 6d	.0440-.0435	.0477-.0470	£14 18s 9d-£14 16s 3d	8½	56.375-55.625	56.25-55.50	46¾-46	20¼-19⅝	76
Apr. 20	.0410	.0425	£11 12s 6d-£11 10s	.0440-.0435	.0477-.0470	£15 2s 6d-£14 17s 6d	8½	56.10-55.00	55.90-54.875	46¾-45½	20¼-19⅛	76
Apr. 27	.0410	.0425	£11 11s 3d-£11 7s 6d	.0440-.0435	.0477-.0470	£15 2s 6d-£14 17s 6d	8½	55.95-54.90	55.95-54.90	45½-42½	19⅛-18¾	76
Close Apr. 30	.0410	.0425	£11 7s 6d	.0440	.0475	£14 18s 9d	8½	55.20	54.60	42.85	18⅝	76
Net Change	+.0020	+.0025	—5s	+.0010	+.0010	—3s 9d	+½	—.05		—2.65	—1⅛	
1934 High-Low		.0425-.04		.0440-.0425	.0475-.0460		8½-.08	56.65-50.37	56-49.85			76.50-68.00

Zinc dust prices—there is a differential of $0.02 per lb., for carlots above St. Louis zinc market; 5 tons to carloads, $0.0275; less than 5 tons, $0.325. Closing prices of other metals; antimony, 7⅞c; '34 high-low, $.0820-.0715.

of the finished products of the industry is specifically exempted from inclusion under the code by reason of the customary practice of farmers and growers to mix their own materials.

New Packages

Gimbels has done a remarkably fine job in redesigning its packaged line of soaps,

A splendid example of the art of plastic molding is this sturdy but graceful cap which Proctor and Gamble have chosen as a closure for their new soapless shampoo.

metal polishes, floor polishes, waxes and other chemical specialties . . . After a half a century Borsum's "Wonderful Polish" packaging has been re-designed with a new type of can and a modern label . . . Roy Sheldon did the re-designing for new proprietors, Wilbert Products, N. Y. City. Cans are produced by Metal Package Corp.

Insecticide Code Signed

Code of Fair Competition for the household insecticide and disinfectant industry was approved Apr. 7 and became effective Apr. 18.

J. L. Ferguson Co., manufacturer of "Packomatic" packaging machinery, has appointed Amsco Packaging Machinery, 122 Centre st., N. Y. City, as eastern representative.

A. L. Benz is sales director for the Wax-Rite division, Vestal Chemical Laboratories, St. Louis.

New Specialty Producer

Flexo Products, Inc., has been organized by J. Leonard Heimlech and several associates in Le Roy, N. Y., to manufacture cleaning fluids and other chemicals.

Wilson & Bennett Appoint

Wilson & Bennett Mfg., has appointed Southwest Sales, Dallas, as sales representatives for the W. & B. line of steel containers.

Fertilizers

Tag Sales Increase

Fertilizer tag sales continue to reflect widespread improvement over a year ago. March fertilizer tax tag sales were 50% larger than for March, '33 and 93% above March, '32, but were slightly lower than for March, '31. They were 32% larger than the average sales for the month of March for the last 3 seasons but were 40% less than the average for the 3 years, '28-'30.

Passage of the Bankhead Cotton Control Bill limiting production to 10,000,000 bales in the coming year has added not a little degree of uncertainty into the picture for the future.

In the fertilizer materials' markets the outstanding event was the general price weakness in the organic ammoniates. Both domestic and imported materials were lowered in the 30-day period. Bone materials likewise were off from the quotations of the month previous. While 1st hands continued to quote $25 on sulfate of ammonia, 2nd hands were reported offering material at concessions of $1.00 to

March Fertilizer Tag Sales

		Equivalent tons*						
	P.C. of	March			P.C. of	January-March		
South—	1933	1934	1933	1932	1933	1934	1933	1931
Virginia†	105	60,509	57,651	37,088	120	148,856	124,019	114,335
North Carolina	154	306,997	199,060	136,883	150	508,808	338,876	261,424
South Carolina	117	243,808	208,437	163,819	142	409,709	288,675	241,198
Georgia	148	304,801	206,203	153,515	176	435,229	247,951	210,032
Florida†	201	39,775	19,609	22,842	116	122,272	105,514	123,317
Alabama	186	142,450	76,600	68,600	199	217,050	108,750	99,250
Mississippi	395	79,425	20,120	25,967	307	107,355	34,995	43,900
Tennessee†	122	14,683	12,041	11,954	143	30,808	21,493	21,326
Arkansas‡	332	12,200	3,675	3,100	346	29,320	8,475	9,600
Louisiana†	118	13,800	11,667	11,470	175	40,358	23,017	23,854
Texas†	207	15,190	7,348	4,148	202	40,780	20,153	22,218
Oklahoma	1,073	805	75	260	242	4,425	1,825	2,670
Totals, South	150	1,234,443	822,486	639,646	158	2,094,970	1,323,743	1,173,124
Midwest—								
Indiana	254	27,750	10,919	15,537	231	37,469	16,213	22,137
Illinois	230	3,427	1,489	5,081	234	7,627	3,260	7,326
Kentucky	157	12,318	7,838	21,658	121	24,209	19,950	32,355
Missouri	194	4,437	2,290	4,847	274	12,837	4,689	10,860
Kansas	919	570	62	185	436	750	172	1,265
Totals, Midwest	215	48,502	22,598	47,308	187	82,892	44,284	73,943
Grand totals	152	1,282,945	845,084	686,954	159	2,177,862	1,368,027	1,247,067

*Monthly records of fertilizer tax tags are kept by State Control Officials and are slightly larger or smaller than the actual sales of fertilizer. The figures indicate the equivalent number of short tons of fertilizer represented by the tax tags purchased and required by law to be attached to each bag of fertilizer sold in the various States. †Cottonseed meal sold as fertilizer included. ‡Excludes 17,800 tons of cottonseed meal for January-March combined, but no separation is available for the amount of meal used as fertilizer from that used as feed.

Fertilizer Materials, Principal Selling Points

	N. Y.		Chicago		Baltimore		Atlanta		San Francisco	
Product	Mar. 31	Apr. 30	Mar. 29	Apr. 26	Mar. 31	Mar. 25	Mar. 29	Apr. 25	Mar. 26	Apr. 23
Ammonium sulfate, bulk, dom.	$25.00p	$25.00			$25.00p	$25.00	$25.00p	$25.00	$30.00p	$30.00
Ammonium sulfate, imp.	25.00p	25.00			25.00p	25.00	25.00p	25.00	30.00p	30.00
Blood, dried, dom.	3.25	3.00	$2.90	$2.50	3.25	3.25	3.25		2.40	2.35
Blood, dried, imp.	3.15	3.00							2.55†	2.50
Bone, raw, 4½&50			22.00	21—22	26.00	26—27			24.00	25—27
Bone steamed, 1¼&60			16.00	15—17						
Bone, 3&50 Meal			18.00	17—19	25.00	25—26			23.00	21—23
Bone So. America arrive	25.50p	25.00								
Castor Pumice, dom.	18.50pp	18.50	18.50pp	18.50	18.50pp	18.50	18.50pp	18.50		
Castor Pumice, imp.	19.50	19.00			19.50p	19.00	19.50p	19.00		
Cyanamid	1.07½d		1.07½d	1.07½	1.07½d		1.07½d	1.07½d		
Fish scrap, unground					3.25&10	3.00&10	3.25&10	3.00&10	3.00&10	
Fish meal					No offerings	42.00			38.50-31-32.50	36.00-31-32.00a
Garbage, tankage					2.75, 10&70	2.75, 10&70				
Hoof meal, dom.			2.50	2.10						
Nitrogenous material	3.10pp	2.75	2.55	2.10	2.80pp	2.75	2.55pp	2.25		
Nitrogenous material, imp.	3.25p	2.75			2.25†	2.75	3.10p	2.85		
Sodium nitrate	24.50p				24.50p	24.50	24.50p	24.50	26.00p	26.00
Superphosphate, 16%					8.00	8.00	12.10-10.90**	12.50**	0.85 unitb	0.80c
Tankage	Nominal	2.65&10	2.35&10	1.90&10			2.65&10‡	2.25&10†	3.10&10	2.40&10
Tankage, imp.	3.25&10d	3.00&10			3.25&10d	3.00&10	3.25&10p	3.10&10	2.95&10†	2.45&10

*p*Ports; *pp*Production points; *d*Delivered; *c.a.f.Baltimore; †c.i.f.Ports; ‡f.o.b. Chicago; **Higher price interior points, lower price coast quotation; *a*1st price f.o.b. Monterey; 2nd price San Francisco; 3rd price c.i.f. Pacific Coast ports.(Japanese materials) *b*Jap material 75c per unit c.i.f. Pacific Coast ports, prompt shipment.

$1.50. There is talk of the present potash prices being extended to July, while in other quarters it is said that new prices will be announced in May. There is gossip in the market of impending advances in superphosphate.

Recovery Board Members

James A. Mullally, formerly a Federal Trade Commission attorney, is now head of the Fertilizer Code Compliance Section. C. T. Melvin, Gulf Fertilizer, Tampa, has been elected vice-chairman of the Fertilizer Recovery Committee. B. H. Brewster, Jr., The Baugh & Sons Co., Baltimore, is vice-chairman of the Administrative Committee.

N. F. A. Visits Shoals

A special N. F. A. Committee conferred with Dr. H. A. Morgan, Dr. Harry A. Curtis, and other members of the T.V.A. Authority and viewed Norris Dam. Members of the Committee were: James W. Dean, chairman; John J. Watson; L. A. Rowell; J. Ross Hanahan; and Spencer L. Carter, who represented George A. Holderness. The new blast furnace phosphoric acid plant will be ready for operation Aug. 1.

S. Carolina Labeling Law

South Carolina legislature will shortly consider bill changing labeling provisions of the fertilizer law so that N will be given on an N rather than an ammonia basis; also for a N-P-K instead of P-N-K order of stating plant foods; also for registration of grades in whole numbers only.

Both Swann and International Agricultural are reported as having taken options on phosphate lands in Williamson County Tenn. . . . James K. Welsh & Co. has opened a Baltimore office with John W. Rutland, former J. H. Baker & Bro.'s Baltimore manager, in charge. Address is 702 Keyser Bldg.

Brand on T. V. A.

"There are strong indications that the T. V. A. is moving rapidly in the direction of large scale fertilizer production," said Charles J. Brand, executive secretary and treasurer of The National Fertilizer Association, in a recent interview. "Already $4,000,000 have been allocated to the fertilizer project, and it seems safe to conclude that the Authority is considering the manufacture of fertilizer on a commercial scale in competition with the existing industry which is now operating at only slightly more than a quarter of its capacity." Mr. Brand pointed out that in the 9 States that are located in or near the Tennessee Valley there are 463 fertilizer plants with a capacity to produce fully 8,400,000 tons of mixed fertilizer annually. In the same group of States the peak consumption reached in '30 amounted to only 4,740,000 tons of all fertilizer, and in '32 consumption dropped to 2,222 000 tons or to only 22 per cent. of capacity.

"The Act that created the Authority is mandatory with respect to the experimental fertilizer program, but no large scale production of fertilizer by the Government is required," Mr. Brand said. "These facts were clearly brought out in the hearings, by the debates in Congress, and by the language of the Act itself. If as a result of its experiment the Authority should discover a new and cheaper method of producing fertilizers, the existing fertilizer industry should, it would seem, be given the first opportunity to employ the process. In that way, the benefits of the research program would be passed on to all farmers who use fertilizer, rather than to a relatively few farmers who live in the Tennessee Valley.

"Large scale production of fertilizer at Muscle Shoals would not result in the employment of more labor, since neighboring fertilizer plants would have to curtail their operations. Neither would such large scale production increase the total consumption of phosphate rock from the Tennessee field for the reason that plants in the Valley that now use Tennessee rock would be forced to operate at

United States Imports and Exports of Fertilizer and Fertilizer Materials
By Classes—Total for All Countries—Long Tons

(Summarized by The Nat'l Fertilizer Ass'n from Dept. of Commerce Preliminary Reports)

IMPORTS**

	March			January-March		
	*1934***	*1933*	*1932*	*1934***	*1933*	*1932*
Ammonium sulfate	20,372	41,208	24,630	92,885	122,476	63,049
Ammonium-sulfate-nitrate	0	0	0	0	0	75
Calcium cyanamide	18,237	10,566	8,503	37,015	25,321	19,945
Calcium nitrate	9,428	2,900	933	14,824	8,517	3,495
Guano	47	763	0	236	7,135	3,233
Dried blood	437	154	812	897	513	1,945
Sodium nitrate	74,584	106	54	125,617	3,027	42,592
Urea and calurea	1,201	1,018	257	2,099	1,935	1,782
Ammonium phosphates	1,297	99	*	2,392	300	*
Tankage	507	1,453	1,966	2,108	4,238	5,871
Castor Pumace	1	*	*	2,050	*	*
Other nitrogenous	21,611	3,357	2,905	33,847	8,954	5,266
Total nitrogenous materials	147,722	61,624	40,060	313,970	182,416	147,253
Bone phosphates	1,185	3,416	4,162	4,535	8,252	11,530
Superphosphates	1,082	1,619	3,602	3,562	5,178	6,017
Phosphate rock	0	0	6,300	0	2,100	6,300
All other phosphates	0	545	172	0	545	1,261
Total phosphate materials	2,267	5,580	14,236	8,097	16,075	25,108
Muriate of potash	14,760	6,086	5,118	36,324	17,648	15,721
Kainite, 14%	5,067	2,848	16,893	11,800	10,117	27,050
Kainite, 20%	21,589	1,064	‡	35,336	3,616	‡
Manure salts, 30%	4,261	7,222	17,604	33,989	22,818	40,746
Sulfate of potash	4,092	2,968	2,075	9,955	6,242	6,100
Sulfate of pot. magnesia	2,781	494	*	7,424	1,432	*
Nitrate of potash	2,769	1,182	*	5,014	2,672	*
Other potash	25	21	144	37	206	191
Total potash materials	55,344	21,885	41,834	139,879	64,751	89,808
Nit-phos-& pot. fertilizers	156	143	227	857	1,111	715
Other fertilizers	1,292	8,130	3,779	6,150	17,625	10,479
Grand total	206,781	97,362	100,136	468,953	281,978	'273,363

EXPORTS

Ammonium sulfate	1,923	25	1,938	3,094	722	11,900
Other nitrogenous chemicals†	33,879	8,779	621	55,234	23,735	42,166
Nitrogenous organic waste	1,636	681	684	3,577	1,693	991
Total nitrogenous materials	37,438	9,485	3,243	61,905	26,150	55,057
High grade hard rock	2,850	2,917	5,618	21,175	7,445	26,446
Land pebble rock	72,806	70,078	65,856	190,264	157,804	165,224
Total phosphate rock	75,656	72,995	71,474	211,439	165,249	191,670
Superphosphates	179	81	246	1,776	1,949	3,186
Other phosphate materials	115	89	142	2,678	248	468
Total phosphate materials	75,950	73,165	71,862	215,893	167,446	195,324
Potash fertilizers	4,312	1,928	1	6,561	5,248	56
Concentrated chem. fertilizers	703	848	545	4,309	2,554	2,665
Prepared fertilizer mixtures	289	55	81	352	150	236
Grand total	118,692	85,481	75,732	289,020	201,548	253,338

*Not previously stated separately. ‡Included in kainite, 14%. †Chiefly domestic synthetic sodium nitrate. **The *import* figures for 1934 represent the imports entered for consumption *plus* withdrawals from warehouses for consumption.

Cottonseed Products Prices

	Atlanta						Hull (England)		Chicago				
Week Ending	*Prime Crude oil*	*7% Meal**	*Hulls Loose*	*Hulls 1st cut*	*Linters Clean Mill*	*Linters 2nd cut*	*Refined† Weekly, High—Low*	*Egyptian crude† Weekly, High—Low*	*Prime Crude oil*	*Yellow oil del. Chgo.*	*Edible Carlots*	*l. c. l.*	
Mar. 29	$4.38	$25	$14	4½—5c	4c	3¾—4c	14s 6d	12s	4⅛—4⅝	6c	6¾—7c		
April 4	4.25	25	14	4½—5	4	3¾—4	14s 6d—13s 9d	12s—11s 6d	4⅛—4½	6	6¾—7	7¼—7½	
April 11	4¾	25	14	4½—5	3¾—4	4	14s—13s 9d	12s—11s 6d	4⅛—4½	6	6¾—7	7¼—7½	
April 18	4⅝	25	14	4½—5	4	3¾—4	14s 3d—14s	12s 6d—12s	4⅛—4½	5¾	6½—7	7 —7½	
April 25	4½	25	14	4½—5	4	3¾—4	14s 3d—14s	12s 3d—12s	4 —4⅝	5½	6½—7	7 —7½	
Close April 30	4½	25	14	4½—5	4	3¾—4	14s 3d	12s 3d	4 —4⅝	5½	6½—7	7 —7½	

†Per cwt.; *Interior mill points.

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JACQUES WOLF & CO.

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Passaic, N. J.

Warehouses: **Providence, R. I. • Philadelphia, Pa. • Utica, N. Y. • Chicago, Ill. • Greenville, S. C. • Chattanooga, Tenn.**

a lower rate of production, if they would not be forced to close down completely.

"Furthermore," Mr. Brand stated, "of the by-product sulfuric acid now produced in Tennessee a very large portion is used in the production of superphosphate. If the T. V. A. engages in a large scale production of fertilizer, the market for this by-product sulfuric will be destroyed and it will have to seek new markets in competition with that which is produced in other plants.

"There is much to commend in the program of planned economy which the T. V. A. is developing," Mr. Brand said, "but it is to be hoped that the existing fertilizer, superphosphate, and sulfuric industries in and near the Valley will receive due consideration in the planning."

Dept. of Agriculture will broaden its search for substitutes for lead arsenate and other poisonous spray materials now in general use to protect fruit and vegetables from insects. Three bureaus, Bureau of Entomology, Bureau of Chemistry and Soils and Bureau of Plant Industry, will participate in the enlarged program.

Price Comparison, Principal Vegetable, Animal and Fish Oils

Oil	San Francisco Mar. 26	San Francisco Apr. 23	Chicago Mar. 30	Chicago Apr. 27	Baltimore Mar. 30	Baltimore Apr. 25	N. Y. Mar. 30	N. Y. Apr. 28
Vegetable Oils:								
Coconut, crude, tanks	2⅝*	2¼c*	2⅜c*	2⅜c*			2⅜c*	2⅜c*
Chinawood, tanks	7⅞*	7.8*	8.2 del	9.1 del			7.6 del	7.8*
Corn, crude, tanks			4⅝ del	4⅝ del			4⅝a	4⅝a
Peanut, crude, tanks	5‡	5‡	4¾†	4⅞†			5b	5⅛b
Perilla, tanks	8¼*	7½*					nominal	.07¾*
Soybean, dom., tanks	7 del	7 del	5.9a	5.9a			6½a	6½a
Soybean, crude, Oriental	3⅝†	3†						
Sesame, crude, tanks	5¾‡	5¾‡						
Fish Oils:								
Menhaden, crude, tanks.					16b	16b		
Menhaden, light pressed.			6—6¼	6¾—7			47/10	47/10
Salmon, tanks	no prices	nominal	16—17‡	16—17‡			no prices	16—17‡
Whale, crude, tanks	4*	4*	4*	4*			4*	4*
Herring, tanks	no prices	no prices	no prices	no prices			no prices	no prices
Sardine, tanks	20‡	22½‡	16—17‡	22—23‡			no prices	22½‡
Animal Oils:								
Degras, com. dom.			4—5	4—5				
com. neut.			10½—11	10½—11				
Lard No. 1			6¾—7	6¾—7				
No. 2			6¼—6¾	6¼—6¾				
Extra			7½—7¾	7½—8				
Oleo, No. 1			5½—6	5½—6				
No. 2			4¾—5¼	4¾—5¼				
Tallow, acidless			6¾—7	6¾				

*f.o.b. tank cars, Pacific Coast Ports; c.i.f. Pacific Coast Ports, bulk, steamers tanks; ‡f.o.b. tank cars, Pacific Mills; af.o.b. Mid-west Mills; bf.o.b. producing point.

Cottonseed Products

	On hand August 1	Produced Aug. 1 to Mar. 31	Shipped out Aug. 1 to Mar. 31	On hand March 31
Crude oil, pounds—				
1933-1934	*51,269,417	1,144,531,451	1,065,840,099	*146,569,028
1932-1933	29,523,581	1,184,952,650	1,086,023,256	161,534,905
Refined oil, pounds—				
1933-1934	†676,331,574	‡937,447,234	.....	†838,547,096
1932-1933	628,420,148	939,868,845	.....	808,228,483
Cake and meal, tons—				
1933-1934	160,874	1,669,676	1,566,251	264,299
1932-1933	114,656	1,724,844	1,554,923	284,577
Hulls, tons—				
1933-1934	76,686	979,847	979,512	77,021
1932-1933	162,773	1,083,080	1,133,732	112,121
Linters, running bales—				
1933-1934	70,786	694,838	621,130	144,494
1932-1933	235,521	603,452	555,240	283,733
Hull fiber, 500-lb. bales—				
1933-1934	985	35,714	34,128	2,571
1932-1933	4,138	15,113	7,067	12,184
Grabbots, motes, etc., 500-lb. bales—				
1932-1934	3,216	33,014	27,983	8,247
1932-1933	15,250	21,439	18,804	17,885

*Includes 4,274,646 and 14,075,015 lbs. held by refining and manufacturing establishments and 14,320,860 and 21,128,750 lbs. in transit to refiners and consumers Aug. 1, '33, and Mar. 31, '34, respectively. †Includes 5,498,953 and 2,904,180 lbs. held by refiners, brokers, agents, and warehousemen at places other than refineries and manufacturing establishments, and 12,642,917 and 6,742,450 lbs. in transit to manufacturers of lard substitute, oleomargarine, soap, etc., Aug. 1, '33, and Mar. 31, '34, respectively. ‡Produced from 1,018,822,223 lbs. of crude oil.

Exports for 7 Months Ended Feb. 28

	1934	1933
Oil crude....lbs.	12,104,006	27,451,960
Oil, refined....lbs.	4,216,006	4,601,069
Cake and meal....tons of 2,000 lbs.	71,890	134,296
Linters....running bales	99,052	95,882

Bleachable Prime Summer Yellow (cents per lb. tanks)

(N. Y. Produce Exchange)

Futures	Mar. 29*†	Apr. 6*	Apr. 13*	Apr. 20*	Apr. 27*	Close Apr. 30*
March	5.15					
April	5.30—5.38	5.20	5.30—5.45	5.20		
May	5.35—5.55	5.35—5.38	5.34—5.36	5.20—5.22	5.01—5.05	5.05—5.15
June	5.58—5.60	5.40—5.60	5.35—5.55	5.20—5.40	5.12—5.25	5.15—5.35
July	5.60—5.80	5.59—5.60	5.55—5.59	5.42—5.45	5.31—5.33	5.35—5.40
August	5.78—5.80	5.60—5.75	5.65—5.80	5.45—5.57	5.35—5.50	5.38—5.52
September	5.84—5.89	5.80—5.84	5.77—5.80	5.64—5.67	5.52—5.54	5.57—5.60
October	5.85—5.95	5.89—5.90	5.83—5.86	5.72—5.74	5.62—5.65	5.68—5.69
November	5.85—5.89	5.96—5.97	5.85—5.95	5.75—5.84	5.69—5.75	5.70—5.80
December					5.72—5.80	5.75—5.80
Total sales contracts for week		427 (352 Switches)	347 (168 Switches)	269 (108 Switches)	361 (116 Switches)	
Spot prime summer yellow	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal
Crude, Southeast	4.50	4.37½	4.50	4.37½	4.37½	4.25‡
Valley	4.50	4.37½	4.37½—4.50	4.25	4.25	4.12½‡
Texas	4.12½	4.00	4.12½	4.00	4.00	4.00‡

*Closing price on Fridays; sSale; †Last trading day of the month; ‡Bid.

Memphis Cottonseed Meal Market

Futures	March 29*†	April 6*	April 13*	April 20*	April 27*	Close April 30*
April	$23.60—24.00	$23.25—23.75	$22.00—22.50	$20.50—21.50		
May	24.25—24.50	23.55—23.85	22.10	20.90—21.50	$21.00	$20.50—21.00
June	24.25—24.75	24.00—24.25	22.35—22.75	21.40—21.85	21.50	21.00—21.40
July	24.90—25.25	24.60—24.75	23.10	22.25	21.85—22.25	21.50—22.00
August	25.30—25.65	25.00—25.20	23.45—23.75	22.40—22.75	22.25—22.65	22.05—22.50
Sept.	25.75	25.50—25.75	24.10	22.80—23.25	22.75—23.15	22.40—22.60
October	26.00—26.50	25.85—26.10	24.40—24.60	23.15—23.75	22.90—23.40	22.60—23.00
Nov.	26.25—26.75	26.10—26.55	24.75—25.00	23.75—24.25	23.35—23.70	23.00—23.25
Dec.					23.35—24.00	23.25—23.75

*Friday prices; †Last trading day of month.

Oils and Fats

Chinawood made a ½c advance in the 1st week of the past month but then lost most if not all of this gain in the face of light trading and only nominal interest by buyers. The fluctuations were partly the result of the decline in silver prices. Coconut quotations showed very little change throughout the 30 day period. Uncertainty over the tax question caused buyers to hold commitments down strictly to immediate requirements only. In fact the situation in Washington was the direct reason for very light trading in practically all of the vegetable oils.

Out on the Coast quotations on sardine were jumped to 22½c f. o. b. Monterey. Production statistics on fish oil on the Coast are given as follows:

	Season 1933-34 Gallons	Season 1932-33 Gallons
Northern California	5,995,301	4,336,345
Southern California	3,267,202	2,161,476
Totals	9,262,503	6,497,821

In the Baltimore area trading was small with the market ranging between 16 and 20c depending upon the grade of menhadan offered. A decidedly firm tone was noted in the Chicago animal oil market.

Oil Notes

Spencer Kellogg's Detroit office is now at the warehouse at 3215 Bellevue ave. with J. A. Miller in charge. Murray Oil Products (oils) has named W. B. Leslie Co., 1213 W. 3rd st., Cleveland, as district representative.

New Trading Rules

N. Y. Produce Exchange has published proposed rules governing transactions in vegetable oils in bulk (steamers' tanks and/or compartments). In the near future a general meeting will be held for full discussion.

The Financial Markets

Allied Stockholders Meet

James W. Gerard, allied chemical stockholder and former Ambassador to Germany, who last year protested strongly against the small amount of information given by the company, sent his secretary to the annual meeting last month with a list of questions, only one of which was answered. F. J Emmerich, vice-president of the company, presiding at the meeting, answered a question on salaries and bonuses with the statement that no bonuses or extra compensation had been paid in '33.

Mr. Gerard's questions also covered company's large investment holdings which included at the close of '33 of about $30,000,000 of marketable securities other than the company's holdings of its own stock of approximately $31,000,000. Holdings of the U. S. Government securities were separately carried in current assets at $21,263,318. No information was forthcoming. A year ago the stock exchange protested that the company's statements were insufficiently detailed and after protracted negotiations, company agreed to give more information.

Walter E Frew, chairman of the Corn Exchange Bank Trust Co., retired voluntarily from the Allied Chemical board. Two new directors were elected, one to fill a vacancy. They were Joseph N. Ford, treasurer, and W. C. King, secretary of the company.

Large stock holdings of Solvay American Investment at last reports 499,697 shares, were not voted at the meeting, it was indicated by the amount of stock voted, 1,467,900 shares out of the 2,794,137 issued. This stock was not voted a year ago when Baron Janssen, understood to be a representative of the Solvays, left the board.

U. S. I. Compensation Plan

U. S. I. stockholders at the annual meeting approved of an amendment to the additional compensation plan, provisions of which are approximately the same as those in the original plan except that no additional compensation will be paid by U.S.I. prior to the distribution of cash dividends to stockholders.

Charles E. Adams, chairman of the board, stated that the company has been in receipt of a number of letters recommending this provision, and that the recommendations had been adopted.

Industrial Rayon To Vote

Board of directors of Industrial Rayon has called a special stockholders' meeting for May 18 to vote on increase in capital stock from 200,000 no-par shares to 1,200,000 authorized no-par shares. On approval of plan new stock will be issued to stockholders on basis of 3 shares of new stock for one share of present stock. On completion of plan company will have outstanding 600,000 shares of the new stock.

Curb Rulings

Curb has removed from unlisting trading privileges Consolidated Chemical Industries class A participating preference stock; also Cliffs Corp.'s voting trust certificates for common stock; also Abbott Laboratories' no par common stock.

Monroe Chemical common (no par value) was another security removed from unlisted trading privileges.

Recent Curb listings include Catalin's 536,964 shares of common (par $1). Vanadium Alloys Steel capital stock has been removed from trading privileges (unlisted).

Committee on securities of the N. Y. Curb has ruled that Dow common be not quoted "ex" the 50% stock dividend until further notice.

I. C. I.'s Dividend

Imperial Chemical Industries has declared a dividend of 1% on the deferred shares, par. los., payable June 1. Last previous payment was 2% made in June, '30.

Eastern Magnesia Talc, Burlington Vt., has declared a quarterly dividend of 75c on capital stock, payable Apr. 2 to holders of record Mar. 24. This compares with 50c paid on Dec. 31 last.

Peaslee-Gaulbert has declared a dividend of 1¾% on account of accumulations on the 7% pref. stock, payable Apr. 1 to holders of record Mar. 24. Similar distribution was made Dec. 26. Following this payment accumulations will amount to $3.50 a share.

Dividends and Dates

Name	Div.	Stock Record	Payable
Air Reduction...	$0.75	Mar. 31	Apr. 16
Allied Chem.....	$1.50	Apr. 11	May 1
Amer. Sin. & Ref. 7% 1st pf. acc.	$4.50	May 4	June 1
Archer-Daniels-Mid. pf.....	$1.75	Apr. 20	May 1
Atlas Powder pf.	$1.50	Apr. 20	May 1
Can. Indus. pf...	$1.75	Mar. 31	Apr. 16
Celanese Am. 7% cum. pt. acc...	$4.00	Feb. 16	Mar. 2
Corn Prods Ref..	.75	Apr. 2	Apr. 20
Corn Prods Ref.pf	$1.75	Apr. 2	Apr. 16
Dow Chemical	.50	May 1	May 15
Dow Chemical pf	$1.75	May 1	May 15
Dow Chem.(stock)	50%	June 16	July 2
duPont, deb.....	$1.50	Apr. 10	Apr. 25
Freeport Texas pf	$1.50	Apr. 13	May 1
Freeport Texas..	.50	May 15	June 1
Hercules Powd. pf	$1.75	May 4	May 15
Int'l Nickel pf...	$1.75	Apr. 3	May 1
Int'l Printing Ink pf.....	$1.50	Apr. 14	May 1
Liquid Carbonic.	.25	Apr. 16	May 1
Monsanto Chem. (stock).....	100%	Apr. 20	Apr. 30
Monsanto Chem.	.25	May 25	June 15
Nat. Carbon pf..	$2.00	Apr. 20	May 1
Nat. Lead pf B..	$1.50	Apr. 20	May 1
Nat. Lead pf A..	$1.75	June 1	June 15
New Jersey Zinc.	.50	Apr. 20	May 10
Penn. Salt Mfg..	.75	Mar. 31	Apr. 14
Proctor & Gamble 8% pf.....	$2.00	Mar. 22	Apr. 14
Proctor & Gamble	.37½	Apr. 25	May 15
Shawinigan Wat. & Pwr.....	.12	Apr. 25	May 15
Sherwin-Williams	.50	Apr. 30	May 15
Sherwin-Williams pf AA.....	$1.50	May 15	June 1
Solvay Amer. Inv. pf.....	$1.37½	Apr. 16	May 15
United Carbon pf	$3.50	June 16	July 1
Vulcan Detinning pf.....	$1.75	Apr. 10	Apr. 20
Vulcan Detinning pf.....	$1.75	July 10	July 20
Vulcan Detinning Spec.....	$3.00	Apr. 10	Apr. 20

Over the Counter Prices

	Feb. 28		Mar. 30*		Apr. 30	
American Dry Ice,	1½	3½	5	9½	4½	5½
American Hard Rubber.....	9½	13½	8	10½	8	11
Canadian Celanese, com.....	18½	20¼	18½	20½	18½	20½
Canadian Celanese, pfd.....	105	107½	115	118¼	114	117
Dixon Crucible .	46	50½	50	54	57½	62
Merck, pfd.....	116	120	121	126	122½	126½
Tubize Chat.,7%, cum. pfd.....	60	65½	60½	65½	60½	65
Worcester Salt .	49¼	53	49	53	49	53
Young,J.S.pfd..	85	...	86	...	89	...
Young,J.S.com..	63	...	66	...	65½	...
Int'l Salt 5's,'51	92	94½	97	99½	...	...

*Last trading day of month.

Foreign Markets

London	Feb. 28	Mar 29*	April 30
British Celanese	14s 4½d	14s ½d	12s 9d
Celanese.....	£8	£7⅛	£5¾
Courtaulds.....	£2⅝	53s 7½d	52s 7½d
Distillers	87s 3d	88s 9d	91s 9d
I. C. I.....	35s 4½d	37s 1½d	36s 10½d
Unilever, ord...	£1¼	23s 1½d	23s 6d
Un. Molasses...	24s	25s 3d	24s
Paris			
Kuhlmann.....		531	611
L'Air Liquide ..	730	686	780
Berlin			
I. G. Farben....	135	142	138
Milan			
Snia Viscosa†...	239½	233	222¾
Montecatini....	140	148½	138¼

*Last trading day of month.

Price Trend of Chemical Company Stocks

	Close Mar. 31	Apr. 6	Apr. 13	Apr. 20	Apr. 27	Close Apr. 30	Net Gain or Loss	1934 High	1934 Low	1933 High	1933 Low
Allied Chem...	153	153	150½	152	145¼	144	—6	160¾	144	152	70¾
Air Reduction .	95	98½	98⅝	98½	101¾	99⅝	+4⅝	106¼	93¾	112	47½
Anaconda.....	15⅛	16¾	16¾	17⅛	16¼	15½	+ ⅜	17¾	13½	22⅞	5
Col Carbon....	67	69⅞	69½	73⅜	73	70	+3	77¼	58	71½	23⅛
Com. Solvents..	29	28⅝	29¼	29	26⅞	25¾	—3¼	36¾	25¾	57¾	9
du Pont.....	95⅜	98	97	98½	95¼	92	—3⅜	103⅞	90⅝	96⅜	32⅛
Mathieson.....	35¼	34½	36	36¼	34½	33½	—1¾	40¾	32¼	46⅝	14
Monsanto.....	87	94¼	93⅞	92½	92	46*	....	46½	46*	83	25
Std. N. J.....	45½	46¼	45⅝	46	45½	44⅝	— ⅞	50⅛	44⅛	47½	22¾
Texas Gulf S..	37	38¼	37	37¼	35¼	34⅞	—2⅛	43¼	34½	45¼	15¼
U. S. I.....	51½	52½	53½	54	51¼	50⅝	— ⅞	64¾	50	94	13½

*New stock.

Chemical Values Off

Chemical stocks on the N. Y. Stock Exchange showed a decline in April—from $3,678,545,149 on May 1 to $3,641,459,047 on Apr. 1.

Company Reports

Du Pont and wholly owned subsidiaries for quarter ended Mar. 31, shows net income of $11,628,154 after depreciation, obsolescence, interest, federal taxes, etc., comparing with $5,480,515 in 1st quarter, '33. After deducting debenture dividends and including $7,715 company's proportion of losses of controlled companies not consolidated, there was a balance available for common stock in 1st quarter of '34, of $9,982,994 equivalent to 90c a share (par $20) on 11,062,168 average number of common shares outstanding during period. These earnings include dividends from G. M. investment amounting to 22½c a share on du Pont common.

In 1st quarter of '33, balance available for common, including $21,937 company's proportion of losses of controlled companies not consolidated, was $3,825,428, equal to 35c a share on 10,871,977 average common shares. Earnings for that quarter included dividends from G. M. investment amounting to 23c a share on du Pont.

Profit and loss surplus on Mar. 31, was $177,296,510 versus $170,345,234 on Dec. 31, last, and $162,628,788 on Mar. 31, '33.

	1934	*1933*	*1932*	*1931*
Oper inc	$12,109,744	$5,592,691	$7,164,511	$7,319,618
Depr & obsol	3,296,601	3,223,121	3,303,383	3,049,039
Balance	$8,813,143	$2,369,570	$3,861,128	$4,270,579
Inc G M inv	2,499,362	2,499,362	4,989,333	7,484,000
Other inc	1,491,660	878,404	1,262,577	1,232,504
Total inc	$12,804,165	$5,747,336	$10,113,038	$12,987,083
Fedl tax	1,161,823	249,396	405,617	312,017
Interest	14,188	17,425	17,988	18,137
Net inc	$11,628,154	$5,480,515	$9,689,433	$12,656,929
Deb divs	1,637,445	1,633,150	1,633,644	1,492,995
Com divs	5,531,046	5,435,950	10,957,449	11,063,084
Surplus	$4,459,663	a$1,588,585	a$2,901,660	$100,850
†Prev surp	170,345,234	178,717,373	198,933,044	208,082,665
Prem on stk	‡8,387	.....	.....	3,120
Reval G M stk	*2,050,000	‡14,500,000	‡9,981,220	.....
P & L surp	$177,296,510	$162,628,788	$186,050,164	$208,186,635

*Credit; the value of du Pont company's investment in General Motors Corp. common stock was adjusted on books of company in March, 1934, to $157,000,000, which closely corresponded to its net asset value as shown by balance sheet of General Motors Corp. at December 31, 1933. These shares are now valued at $15.70 a share, against $15.45 a share on March 31, 1933, and $16.90 on March 31, 1932. †Surplus on December 31. ‡Debit. aDeficit.

Texas Gulf Sulphur Nets 56c

Texas Gulf Sulphur reports for quarter ended Mar. 31, net income of $1,427,778 after depreciation and federal taxes, but before depletion, equivalent to 56c a share on 2,540,000 no-par shares of stock. This compares with $976,704 or 38c a share in 1st quarter of '33. During 1st quarter of '34, company increased its reserves, including reserves for depreciation and federal taxes, by $240,549 making a total of these reserves $12,262,547 on Mar. 31, last.

	1934	*1933*	*1932*	*1931*
*Net income	$1,427,778	$976,704	$1,722,535	$2,448,198
Dividends	1,270,000	635,000	1,270,000	2,540,000
Surplus	$157,778	$341,704	$452,535	‡$91,802
†P & L surp	$31,145,132	$27,060,444	$26,340,783	$25,108,843

*After depreciation and federal taxes. †Includes reserve for depletion. ‡Deficit.

United Carbon's '33 Profits Rise

United Carbon and subsidiaries in report for year ended Dec. 31, '33, certified by independent auditors, shows profit of $636,217 after depreciation, depletion and other deductions, but before federal taxes. This compares with profit of $145,643 in '32. Capital stock at close of '33 consisted of 17,347 shares of 7% preferred and 370,127 no-par shares of common. Auditors state that federal income taxes for prior years still are in dispute, and no provisions has been made therefor.

Current assets as of Dec. 31, '33, including $667,759 cash, amounted to $3,442 553 and current liabilities were $536,594, compared with cash of $509,591, current assets of $3,159,707 and current liabilities of $521,392 at end of preceding year.

Mathieson Nearly Doubles 1st Quarter Earnings

Mathieson for quarter ended Mar. 31, shows net income of $277,627 after depreciation, depletion, federal taxes, etc., equivalent after dividend requirements on 7% preferred stock, to 38c a share on 623,263 shares of no-par common. This compares with $172,841 or 21c a share on 623,333 common shares in 1st quarter of '33.

	1934	*1933*	*1932*	*1931*
Oper profit	$620,617	$480,443	$538,586	$605,140
Depr & depl	290,848	283,988	286,341	285,064
Profit	$329,769	$196,455	$252,245	$320,076
Inc chgs (net)	7,943	3,653	*14,477	*11,067
Total inc	$321,826	$192,802	$266,722	$331,143
Fedl tax	44,199	19,961	16,437	33,740
Net income	$277,627	$172,941	$250,285	$297,403

*Credits.

Columbian Carbon Earned $1,165,709

Columbian Carbon and subsidiaries for year ended Dec. 31, '33, certified by independent auditors, shows net profit of $1,165,709 after depreciation, depletion, federal taxes minority interest, etc., equivalent to $2.16 a share on 538,420 no-par shares of capital stock. This compares with $954,016 or $1.77 a share in '32. Current assets as of Dec. 31, '33, including $2,827,649 cash and marketable securities amounted to $6,979,484 and current liabilities were $683,941. Consolidated income account for '33 compares as follows:

	1933	*1932*	*1931*	*1930*
Net sales	$9,096,151	$7,427,290	$9,474,216	$9,756,328
Cost of sales	5,101,886	3,841,557	4,893,724	4,308,889
Expenses	1,817,072	1,633,803	1,701,758	1,313,524
Oper profit	$2,177,193	$1,951,930	$2,878,734	$4,133,915
Other income	279,469	271,920	508,032	452,306
Total inc	$2,456,662	$2,223,850	$3,386,766	$4,586,221
Other chgs	204,905	204,247	162,297	169,840
Minority int	‡28,872	†53,533	†30,528	‡237,062
Depr & depl	987,176	1,099,120	1,526,203	1,424,396
Fed tax	70,000	20,000	100,000	240,000
Net profit	$1,165,709	$954,016	$1,628,794	$2,514,923
Dividends	1,071,048	1,338,847	2,614,494	2,936,166
Surplus	$94,661	*$384,831	*$985,700	*$421,243

*Deficit. †Credit. ‡Debit.

Canadian Industries Report For Year

Canadian Industries, Ltd., in report for year ended Dec. 31, '33 (certified by independent auditors), shows consolidated net income, including $696,060 income from investments, of $3,430,475 after taxes, depreciation and other deductions, equivalent after 7% preferred dividends, to $4.63 a share on 670,371 combined no par shares of Class A and Class B common stocks. This compares with net income in '32, including $706,339 income from investments of $2,771,662, or $3.65 a share, on combined common shares.

Consolidated Chemical reports for quarter ended Mar. 31, net profit of $126,277 after depreciation, taxes, etc., equivalent under the participating provisions of the shares, to 43c a share on combined 211,000 shares of Class A preference stock and 80,000 shares of Class B stock. In 1st quarter of '33, net profit was $78,474, equal to 38c a share on 205,000 shares of Class A preference stock. Class A preference stock is preferred as to dividends of $1.50 per share per annum and participates equally share for share with Class B after latter has received $1.50 per annum.

Hercules for quarter ended Mar. 31, shows net profit of $872,926 after depreciation, federal taxes, etc., equivalent after dividends on 7% preferred, to $1.18 a share on 582,729 shares of no-par common, excluding shares in treasury. This compares with $226,978 or 7c a share on 582,978 common in 1st quarter of '33. Current assets as of Mar. 31, including $6,391,535 cash and government securities, amounted to $17,164,427 and current liabilities were $988,376. This compares with cash and government securities of $6,906,563, current assets of $14,421,000 and current liabilities of $451,945 on Mar. 31, '33.

The Industry's Securities

1934 April Last	1934 April High	1934 April Low	1933 High	1933 Low	1932 High	1932 Low	Sales In April	Sales During 1934	Stocks	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1933	Earnings $-per share-$ 1932
April 30							**Number of Shares**							
NEW YORK STOCK EXCHANGE														
99⅜	106½	93½	112	47½	63½	30⅞	19,100	75,000	Air Reduction	No	841,288	$3.00*	3.79	2.73
144	160½	144	152	70¼	88¾	42½	8,800	110,500	Allied Chem. & Dye	No	2,214,099	6.00	5.50	3.62
125⅞	129¼	122½	125	115	120†	96½	800	4,700	7% cum. pfd.	100	345,540	7.00	42.24	29.12
32½	36	25¼	35	7¼	15½	3½	26,900	110,300	Amer. Agric. Chem.	100	315,701	None		—p3.86
46⅜	62½	46½	89⅞	13	27	11	16,400	347,200	Amer. Com. Alcohol	20	260,716	None	4.56	3.01
31½	32⅞	26½	29½	9¾	15½	7	15,100	43,700	Archer-Dan.-Midland	No	541,546	1.00	1.82	q1.44
48	55½	35½	39½	9	25½	7	7,400	46,500	Atlas Powder Co.	No	234,235	2.00	.74	—2.06
98½	101½	83	83½	60	79½	45½	740	3,300	6% cum. pfd.	100	88.781	6.00	8.38	.47
28¾	44½	28⅝	58⅞	4½	12⅜	1½	91,100	638,300	Celanese Corp. Amer.	No	987,800	None	3.32	— .95
16¼	18⅝	9½	22⅜	7	31½	10¼	77,100	459,700	Colgate Palm-Peet	No	1,985,812	None	— .57	— .74
92	92	68½	88	49	95	65	2,600	5,600	6% pfd.	100	254,500	6.00	1.51	.21
70	77½	58	71½	23⅛	41¼	13½	48,000	154,600	Columbian Carbon	No	538,154	2.00	2.17	1.83
25½	36⅜	26	57½	9	13½	3½	191,600	1,724,700	Commer. Solvents	No.	2,635,371	.60	.88	.51
71⅛	84½	69½	90⅜	45⅜	55⅜	24½	34,700	146,200	Corn Products	25	2,530,000	3.00	3.87	2.77
144	144	135	145¾	117⅛	140	99½	1,590	4,000	7% cum. pfd.	100	243,739	7.00	46.02	35.05
49½	55½	29	33¾	10	16½	7	13,800	51,300	Devoe & Rayn. A.	No	95,000	h1.00		—r1.00
92	103⅞	90⅜	95⅞	32½	59⅜	22	79,900	742,600	DuPont de Nemours	20	10,871,997	i2.00	2.93	1.81
121	121½	115	117	97½	105½	80¾	7,200	22,400	6% cum. deb.	100	1,092,699	6.00	35.58	24.00
93	93¾	79	89¾	46	87¼	35¼	20,900	101,000	Eastman Kodak	No	2,250,921	3.00	4.76	2.52
134	133½	120	130	110	125	99	330	1,150	6% cum. pfd.	100	61,657	6.00	180.34	98.27
44⅜	50⅛	43⅜	49⅜	16⅛	28⅛	10	22,800	132,300	Freeport Texas	10	784,664	2.00	3.01	2.75
155	160½	150½	160½	97	...	...	.....	1,600	6% conv. pfd.	100	25,000	6.00	156.73	
26⅜	28⅛	15⅜	20	3¾	10⅜	3½	63,400	357,400	Glidden Co.	No	603,304	1.00	1.54	—s.06
100½	103	83	91½	48	76	35	1,570	6,135	Glidden, pr. pfd.	100	63,044	7.00	22.60	7.85
93	96¾	86½	85⅞	65	...	...	6,400	22,100	Hazel Atlas	25	434,409	5.00	6.22	4.68
71	75	59	68⅜	15	29½	13⅞	5,400	37,200	Hercules Powder	No	582,679	2.00	2.79	24
119½	120	111	110½	85	95	70½	910	1,720	7% cum. pfd.	100	105,765	7.00	22.38	8.39
72½	96⅜	72½	85	24	40	7⅜	46,800	142,900	Industrial Rayon	No	200,000	4.00	9.03	1.64
4	6½	2	5⅞	⅛	3½	¼	9,300	177,400	Intern. Agricul.	No	436,049	None	—4.04	—q4.47
30	37½	15	23½	5	15	3½	2,400	23,000	7% cum. pr. pfd.	100	100,000	None		
28	29½	21	23½	6½	12½	3½	267,900	1,775,600	Intern. Nickel	No	14,584,025	None	.53	— .14
28⅛	28½	21	27¾	13¼	23½	9½	7,400	24,800	Intern. Salt	No	240,000	1.50	2.04	2.14
21½	24½	15⅜	22	7½	11	8	5,000	31,700	Kellogg (Spencer)	No	500,000	1.00	.98	—v.26
35	43⅞	34½	37⅜	4⅜	9⅜	3½	40,600	552,600	Libby Owens Ford	No	2,559,042	1.20	1.64	— .13
31½	35⅜	27	50	10¼	22	9	64,100	142,900	Liquid Carbonic	No	342,406	1.00		—u1.29
33½	40¼	32¼	46⅜	14	20⅞	9	31,100	313,900	Mathieson Alkali	No	t650,436	1.50	1.70	.86
46	95	75	83	25	30¼	13⅜	8,800	44,000	Monsanto Chem.	10	427,116	k1.25	5.14	2.37
148	160½	136	140	43½	92	45	8,100	13,000	National Lead	100	309,831	5.00	6.98	3.15
147	147	122	128½	101	125	87	300	2,000	7% cum. "A" pfd.	100	243,676	7.00	18.35	13.55
102	103	100½	109½	75	105	61	.....	1,000	6% cum. "B" pfd.	100	103,277	6.00	30.45	15.45
10	13	6	11⅜	1⅜	3¾	1½	16,500	104,800	Newport Industries	1	519,347	None	.05	— .68
84	94	78½	96⅜	31½	42¼	12	8,900	74,600	Owens-Illinois Glass	25	1,200,000	3.00	4.86	1.62
34½	41½	34	47⅜	19⅝	42⅜	19⅞	26,300	133,900	Procter & Gamble	No	6,410,000	1.50	1.52	q1.26
107	109	102½	110¾	97	103½	81	680	3,755	5% pfd. (ser. 2-1-29)	100	171,569	5.00	61.95	52.16
5½	6¾	4⅛	7¼	1⅛	4⅛	1	12,400	58,800	Tenn. Corp.	5	857,896	None		— .89
34⅛	43½	34½	45½	15¼	26¼	12	24,500	335,900	Texas Gulf Sulphur	No	2,540,000	2.00	2.93	2.33
42½	50⅛	41½	51⅛	19½	36⅜	15½	78,500	545,400	Union Carbide & Carbon	No	9,000,743	1.00	1.59	.98
41½	45½	35	37½	10½	18	6½	44,200	110,300	United Carbon	No	370,127	1.60	1.39	— .05
50⅛	64½	50	94	13½	36½	13½	10,000	192,100	U. S. Indus. Alco.	No	391,033	None	3.56	.47
24⅛	31½	21	36½	7⅛	23¾	5½	14,100	390,800	Vanadium Corp.-Amer.	No	366,637	None	—2.40	—4.36
4	5⅜	3⅛	7⅜	⅛	2⅜	⅛	10,100	174,900	Virginia-Caro. Chem.	No	486,000	None	—4.93	—q5.73
20¼	26	14½	26½	3⅜	11¼	3⅛	15,100	42,700	6% cum. pact. pfd.	100	213,392	None		
76	78	59¾	63½	35⅜	69¼	20	400	2,100	7% cum. prior pfd.	100	60,000	None		
21	27½	14½	20½	5	12⅜	3	4,600	91,600	Westvaco Chlorine	No	284,962	.40	1.08	.79
NEW YORK CURB EXCHANGE														
20½	22½	15⅜	16½	3½	8½	1⅜	90,100	416,200	Amer. Cyanamid "B"	No	2,404,194	m1.00	.99	.14
3⅜	4⅛	3½	4⅓	1	2⅛	¼	2,100	23,500	British Celanese Am. R.C.R.	243		None		
95	103½	93½	110	27	55	8	1,275	7,425	Celanese, 7% cum. 1st pfd.	100	144,379	7.00	32.24	.60
94½	96	83	90	51	64½	17	400	2,925	7% cum. prior pfd.	100	113,668	7.00	47.98	7.77
11½	19	12½	26⅞	2	5⅜	1½	1,400	12,800	Celluloid Corp.	15	194,952	None	—1.00	—3.79
...	12¾	10½	11⅜	4½	6⅞	4½	500	11,900	Courtaulds' Ltd.	1£	24,000,000	4¼%		w.26
86	92	69¼	78	30	39	21⅜	8,400	16,800	Dow Chemical	No	630,000	2.00	1.99	2.95
8½	9¼	4	8	½	1½	¼	16,700	32,000	Duval Texas Sulphur	No	500,000	None		s.30
33	37	19	19	8	...	...	2,000	6,200	Heyden Chem. Corp.	10	147,600	1.00	2.68	1.23
50	57½	39	39¾	13	19½	12½	17,075	73,575	Pittsburgh Plate Glass	25	2,141,305	1.00	1.87	— .03
65½	68⅞	47¼	47	12⅝	35	17½	15,500	74,690	Sherwin Williams	25	635,583	2.00	y3.54	— .44
106⅛	107¼	100	99	80	100⅛	75	190	1,040	6% pfd. AA. cum.	100	155,521	6.00	y20.78	4.52
CLEVELAND STOCK EXCHANGE														
86	92	70½	78	30	40	21½	1,235	5,710	Dow Chemical	No	630,000	2.00	1.99	f2.95
PHILADELPHIA STOCK EXCHANGE														
...	61¼	56	57	25¼	40	19⅞	200	875	Pennsylvania Salt	50	150,000	3.00	2.17	2.42

1934 April Last	1934 April High	1934 April Low	1933 High	1933 Low	1932 High	1932 Low	Sales In April	Sales During 1934	Bonds	Date Due	Int. %	Int. Period	Out-standing $
April 30													
NEW YORK STOCK EXCHANGE													
103	103½	93½	95	70½	80	62	75,000	725,000	Amer. Cyan. deb. 5's	1942	5	A. O.	4,411,000
98½	98½	83½	89	64	80	54½	499,000	2,250,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
13½	17½	5	14½	2½	18	1	601,000	2,053,000	Anglo Chilean s. f. deb. 7's	1945	7	M. N.	12,700,000
84	88	61½	74½	37	60	34½	70,000	273,000	By-Products Coke Corp. 1st. 5½'s "A"	1945	5½	M. N.	4,932,000
100½	101⅛	100½	104½	100½	104⅞	100⅛	7,000	56,000	Corn Prod. Refin. 1st. s. f. 5's	1934	5	M. N.	1,766,000
79	79	62	65	38½	54⅛	32	22,000	102,000	Int. Agric. Corp. 1st. Coll. tr. stamped to 1942	1942	5½	M. N.	5,994,100
15½	19½	5½	14⅞	2⅜	15½	½	2,759,000	7,158,000	Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
97¾	98½	96	99½	87	97¼	67	34,000	346,000	Montecatini Min. & Agric. det. 7's with warrants	1937	7	J. J	7,075,045
...	74	52½	62	33½	59	17	104,000	382,000	Ruhr Chem. 6's	1948	6	A. O.	3,156,000
86	87	65½	76	50	66	39	13,000	67,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
87	89½	62	81	34¾	75	30	27,000	848,000	Vanadium Corp. conv. 5's	1941	5	A. O.	4,261,000
NEW YORK CURB EXCHANGE													
104	104	101⅛	103½	101	103⅛	99	4,000	47,000	Westvaco Chlorine Prod. 5½'s	1937	5½	M. S.	1,393,000

*Plus 75c extra; †Years ended 5-31-32-& 33; hPlus 25c ended 5-31-32-& 33; iPlus 75c ended 5-31-32-& 33; jPlus 75c ended 5-31-32-& 33; kPlus 75c ended 5-31-32-& 33; mIf rate of last quarter be cont.; pYear ended 6-30-32; qYears ended 6-30-32 & 6-30-33; rYear ended 11-30-32; sYears ended 10-31-32 & 33; tBefore issue, rights; uYear ended 9-30-32; vYears ended 9-2-32 & 33; w@ $4,866 to the £; xYears ended 5-31-32 & 33; yYear ended 8-31-33; zYear ended 8-13-32.

The Trend of Prices

Business Improves

Business continued to improve in April although the pace of acceleration showed signs of slowing up. Outstanding were the gains made in the steel industry and the automotive field while some let-up was quite apparent in the textile and tanning centers.

Despite unseasonal weather in parts of the country retail trade reports for April indicate good volume. In part this was due to special sales. Wholesale trade generally was fair to quiet. Warmer weather is likely to bring out delayed purchasing of summer apparel.

Heavy industries continue to give a good account of themselves. Steel activity as the month closed reached 60%, the highest rate reached since last July and with every indication that a still higher rate of operation will be reached in May. Automotive production in April, it is reported, was well over 300,000 units and May total is now expected to duplicate and possibly improve upon this figure.

Situation in the textile field is very irregular. While a satisfactory volume of business appears certain in the rayon field (despite some price instability) the silk group is faced with large inventories. To offset this a week's closing down of all operations has been undertaken.

Tanning schedules have been reduced somewhat in the face of a lessened demand. On the other hand the glass manufacturers generally are operating at satisfactory rate. Building figures continue to show improvement and seasonal betterment is noted in the paint, varnish and lacquer fields. In the Akron tire center volume reflects the steady rate of operations in the automotive field and the old price cutting "bug-a-boo" seems about to be eliminated.

Commodity prices (chiefly farm products) were generally weaker in April. While carloadings showed a decline they were still comfortably ahead of the same period a year ago. The same was true of electrical production figures. *N. Y. Times* Index of Business Activity after dipping slightly in the first week of April continued to rise and closed at a new high point for the current year but still below the record made in July, '33. Aside from this brief spurt in '33, it is necessary to go back to '30 for a level comparable with the present one. April business failures, as reported by Dun & Bradstreet, totaled 1,052, with a total indebtedness of $25,786,975. With the exception of the short month of February of this year, there was not a month since January '20, in which failures were so low in number.

Further betterment of the employment situation is reported by both the Dept. of Labor and the A. F. of L. Statistical Bureau. Payroll disbursements in manufacturing industry in March were 8.5% larger than in February, '34 and 105% larger than a year ago. The number of wage-earners employed increased 4.8% from February to March and was 45.6% higher than in March, '33. Preliminary figures indicate that this favorable trend was carried into April. It is expected now that the strong opposition which has developed to the Securities Bill will force definite modifications and at the moment it appears that Washington is changing its viewpoint on the capital goods industries. These moves, if they materialize, should help business and re-employment to a very noticeable extent.

Chemical production and consumption maintained a fairly steady pace in April, totals comparing favorably with March. Seasonal items are now in better demand. Fertilizer sales, that is sales to the farmer, while large, are not quite as good as first anticipated. Paint sales are heavy.

Month's Business Statistics

	March 1934	*March 1933*	*February 1934*	*February 1933*	*January 1934*	*January 1933*
Auto production	335,993	118,002	235,384	106,888	161,086	130,087
Bldg. contracts*†	$179,161	$59,958	$96,716	$52,712	$186,463	.....
Cotton Consumption, bales.	543,690	495,183	477,890	441,203	508,034	470,182
Factory employment†	76.9	56.6	77.7	61.1	73.3	60.2
Payroll totals†	63.3	36.9	60.6	40.2	54.0	39.5
Failures, Dun & Brad	1,102	1,948	1,049	2,378	1,364	2,919
Merch. imports‡	$158,000	$132,938	$125,292	$83,743	$128,536	$95,993
Merch exports‡	$190,000	$108,015	$162,805	$101,515	$172,174	$118,559
Newsprint Product:						
Canada, tons	210,129	137,078	174,447	125,916	188,374	140,539
U. S., tons	84,993	76,566	72,402	67,085	84,194	74,444
Newfoundland, tons	24,778	21,381	22,038	17,474	25,477	33,207
Total	321,187	236,503	270,358	211,301	299,278	238,598
Newsprint Ship:						
Canada, tons	207,107	140,694	169,054	120,916	187,352	133,056
U. S., tons	87,987	77,857	69,251	67,057	84,796	72,725
Total (Can. & U.S.)	295,184	218,551	238,305	187,973	272,148	205,781
Newsprint Stocks:						
Canada, tons	42,973	50,872	40,445	54,515	34,711	49,837
U. S., tons	18,630	23,005	22,060	23,363	17,784	23,502
Total (Can. & U.S.)	61,603	73,877	62,505	77,878	52,495	73,339
Plate glass output, sq. ft	9,926,859	4,881,322	7,441,278	.....	7,607,195	6,188,263
Shoe production, pairs	30,000,000*x*	.....	29,000,000	26,384,000	25,180,079	22,716,815
Steel ingots	2,797,194	909,886	2,224,698	1,086,867	1,996,897	1,030,075
Tire shipments	.....	.....	3,285,013	2,292,463	3,222,398	2,596,585
" production	.....	.....	4,335,092	2,339,373	3,921,587	2,257,846
" inventory	.....	.....	10,725,032	7,376,946	9,684,389	7,236,845
U. S. consump, crude rubber	.....	18,047	40,609	21,638	40,413	21,661
Silk, bales, imports	32,301	22,289	29,808	23,377	27,976	53,114
U. S. gasoline, use, bbls	.....	.....	24,947,000	23,312,000	29,519,000	.....
Gasoline production, bbls	.....	.....	30,750,000	28,307,000	33,318,000	.....
Chemical						
Elect. energy consumpt.*a*	.....	.....	.....	.....	.....	.....
Stocks, mfg. goods*a*	.....	.....	.....	.....	.....	.....
Stocks, raw materials*a*	.....	.....	.....	.....	.....	.....
Chemical Prices						
Dept. of Labor:						
Chem. price index†	79.0	79.3	78.8	79.0	....	....
Fert. price index†	69.5	61.9	69.2	61.5	....	....
Mixed fert. price index†	72.6	60.1	72.5	62.4	....	....
Chemical Employment						
Dept. of Labor:						
Chem. emp†	107.7	73.7	104.8	....	....	....
Fert. emp.†	160.4	85.0	121.5	....	....	....
Paints & varnish emp.†	98.4	74.1	97.6	....	....	....
Rayon emp.†	321.9	238.4	325.2	....	....	....
Soap emp.†	103.1	81.6	98.0	....	....	....
Turpentine & resin	101.4	67.5	98.6	....	....	....
Chemical payrolls						
Dept. of Labor:						
Chemical†	89.1	59.3	88.0	....	....	....
Fertilizer†	107.3	51.7	81.6	....	....	....
Paint & varnish†	77.1	50.3	74.5	....	....	....
Petroleum refinery	92.0	79.5	90.8	....	....	....
Rayon†	218.2	144.9	220.0	....	....	....
Soap†	88.4	66.8	83.5	....	....	....
Turpentine & rosin	46.2	28.9	51.7	....	....	....
Chemicals & Related Products:						
Exports‡	$8,848	$6,617	$6,676	.....	.....	.....
Imports‡	$7,366	$4,230	$4,230	.....	.....	.....

*37 states, F. W. Dodge Corp.; ‡000 omitted *a* monthly average, 1923-25 = 100, Dept. of Commerce; †Dept. of Labor, 3-year average 1923-1925 = 100.0. This represents a change for previously these indices were based on 1926 = 100; *x* estimated.

Weekly Business Statistics

	Carloadings			Electrical Output			Jour. Com. Price	National Fertilizer Association Indices					Labor Dept. Chem. & Drug Price Index	% Steel Activity	Fisher's Index Purch. Power	N. Y. Time Indexs Bus. Act
Week Ending	*1934*	*1933*	*% Inc.*	*1934**	*1933**	*% Inc.*	*Index*	*Metals*	*Fats & Oils*	*Chem. & Drugs*	*Mixed Fert.*	*Fert. Mat.*	*All Groups*			
March 31	608,443	498,356	22.1	1,665,650	1,402,142	18.8	73.8	78.8	50.3	93.5	75.9	67.8	71.0	75.8	43.3	135.2	84.9
April 7	557,887	492,061	13.4	1,616,945	1,399,367	15.5	74.0	79.2	50.5	93.0	75.9	67.6	71.1	75.5	47.4	136.0	83.2
April 14	578,837	498,182	16.2	1,642,187	1,409,603	16.5	74.0	79.7	48.7	93.0	75.9	67.5	71.1	75.4	50.3	136.3	84.6
April 21	589,453	496,512	18.7	1,672,765	1,431,095	16.9	75.1	79.7	49.0	93.0	76.1	67.1	70.7	75.5	55.0	136.6	87.0
April 28	608,654	538,809	13.0	1,668,564	1,427,960	16.8	74.6	79.8	50.2	93.0	76.1	66.7	70.8	75.3	55.7	136.8	88.7

*kwh., 000 omitted.

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1933 Average $1.56 - Jan. 1933 $1.76 - April 1934 $1.36

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Acetaldehyde, drs 1c-1 wks...lb.	....	.16	.16	.21	.18½	.21
drums, c-l, wks.....lb.	....	.14	.14	.16½	...	...
Acetaldol, 50 gal dr.....lb.	.27	.31	.27	.31	.27	.31
Acetamide.....lb.	.40	.75	.40	1.35	.95	1.35
Acetanilid, tech, 150 lb bbl...lb.	....	.26	....	.26	...	.26
Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.21	.25	.21	.25	.21	.25
Acetin, tech drums.....lb.	.30	.32	.30	.32	.30	.32
Acetone, tanks.....lb.	....	.10	....	.10	.08	.10
Acetone Oil, bbls NY.....gal..	1.15	.25	1.15	.25	1.15	1.25
Acetyl Chloride, 100 lb cby...lb.	.55	.68	.55	.68	.55	.68
Acetylene Tetrachloride (see tetrachlorethane).....						
Acids						
Acid Abietic.....	.06¾	.07	.06	.07	.06	.12
Acetic, 28% 400 lb bbls c-l wks .....100 lb.	....	2.91	....	2.91	2.65	2.91
Glacial, bbl c-l wk....100 lb.	....	10.02	....	10.02	9.14	10.02
Adipic.....	.72	.72	.72	.72	.72	.72
Anthranilic, refd, bbls.....lb.	.85	.95	.85	.95	.85	.95
Technical, bbls.....lb.	.65	.70	.65	.70	.65	.70
Battery, cbys.....100 lb.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb bbls....lb.	.40	.45	.40	.45	.35	.45
Boric, powd, 250 lb. bbls. .....lb.	.0425	.05	.0425	.05	.0425	.05
Broenner's, bbls.. .....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 100% basis cbys....lb.	.80	.85	.80	.85	.80	.85
Camphoric.....lb.	....	5.25	....	5.25	...	5.25
Chlorosulfonic, 1500 lb drums wks.....lb.	.04½	.05½	.04½	.05½	.04½	.05½
Chromic, 99½%, drs.....lb.	....	.13½	....	.13½	.11½	.14¼
Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.00	1.06	1.00	1.06
Citric, USP, crystals, 230 lb. bbls.....lb.	.28	.29	.28	.30	.29	.30
Cleve's, 250 lb bbls.....lb.	.52	.54	.52	.54	.52	.54
Cresylic, 95%, dark drs NY.gal.	....	.55	.50	.55	.38	.50
97-99%, pale drs NY.....gal.	....	.60	.55	.60	.40	.55
Formic, tech 90%, 140 lb. cby.....lb.	.11	.13	.11	.13	.10½	.13
Furoic, tech., 100 lb. drums.lb.	....	.35	....	.35	...	.35
Gallic, tech, bbls.....lb.	.60	.70	.60	.70	.60	.70
USP, bbls.....lb.	....	.77	.74	.77	...	.74
Gamma, 225 lb bbls wks....lb.	.77	.79	.77	.79	.75	.79
H, 225 lb bbls wks.....lb.	.65	.70	.65	.70	.60	.70
Hydriodic, USP, 10% soln cby lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 48%, coml, 155 lb cbys wks.....lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, CP, see Acid Muriatic.....						
Hydrocyanic, cylinders wks .lb.	.80	.90	.80	.90	.80	.90
Hydrofluoric, 30%, 400 lb bbls wks.....lb.	....	.07	....	.07	.06	.07
Hydrofluosilicic, 35%, 400 lb. bbls wks.....lb.	.11	.12	.11	.12	.11	.12
Hypophosphorous, 30%, USP, demijohns .....lb.	.75	.80	.75	.80	.75	.80
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.04	.04½	.04	.04½
44%, light, 500 lb bbls.....lb.	.11½	.12	.11½	.12	.11½	.12
Laurent's, 250 lb bbls.... ...lb.	.36	.37	.36	.37	.36	.37
Linoleic.....lb.	.16	.16	.16	.16	.16	.16
Maleic, cry. kegs.....lb.	....	.35	....	.35	...	...
Malic, powd, kegs.....lb.	.45	.60	.45	.60	.45	.60
Metanilic, 250 lb bbls.....lb	.60	.65	.60	.65	.60	.65
Mixed Sulfuric - Nitric..... tanks wks.....N unit	.06½	.07½	.06½	.07½	.06½	.07½
tanks wks.....S unit	.008	.01	.008	.01	.008	.01
Monochloroacetic, tech bbl...lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls.....lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18 deg, 120 lb cbys c-l wks.....100 lb.	....	1.35	....	1.35	...	1.35
tanks, wks.....100 lb.	....	1.00	....	1.00	...	1.00
20 degrees, cbys wks...100 lb.	....	1.45	....	1.45	...	1.45
N & W.....250 lb bbls	.85	.95	.85	.95	.85	.95
Naphthenic, drums.....lb.	.10	.11½	.10	.11½	.10	.11½
Naphthionic, tech.....250 lb.	.60	.65	.60	.65	.60	.65
Nitric, 36 deg, 135 lb cbys c-wks.....100 lb.	....	5.00	....	5.00	...	5.00
40 deg, 135 lb cbys, c-l wks.....100 lb.	....	6.00	....	6.00	...	6.00
Oxalic, 300 lb bbls wks NY....lb.	.11¼	.12¾	.11¼	.12¾	.11	.12¾
Phosphoric 50%, U. S. P.....lb.	....	.14	....	.14	...	.14
Syrupy, USP, 70 lb drs....lb.	....	.14	....	.14	...	.14
Picramic, 300 lb bbls.....lb.	.65	.70	.65	.70	.65	.70
Picric, kegs.....lb.	.30	.50	.30	.50	.30	.50
Pyrogallic, crystals..... .....lb.	1.40	1.45	1.40	1.45	1.40	1.45
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.33	.37
Sebacic, tech, drum.....lb.	.58	.58	.58	.58	.58	.58
Sulfanilic, 250 lb. bbls.....lb.	.18	.19	.18	.19	.15	.17
Sulfuric, 66 deg, 180 lb cbys						

†Anhydrous 5c higher. *Delivered metropolitan area, basic price 33c. §Higher price is refrigeration grade. a-New revenue tax adds $0.90 to the cost of tax paid ethyl alcohol. Quotation above includes this tax.

	Current Market	1934 Low	1934 High	1933 Low	1933 High
1c-1 wks.....100 lb.	1.60	1.95	1.60	1.95	1.60	1.95
tanks, wks, ton	....	15.00	....	15.00	....	15.00
1500 lb dr wks.....100 lb.	1.50	1.65	1.50	1.65	1.50	1.65
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.27½	1.42½	1.27½	1.42½
Oleum, 20%, 1500 lb. drs 1c-1 wks.....ton	....	18.50	....	18.50	....	18.50
40%, 1c-1 wks net.....ton	....	42.00	....	42.00	....	42.00
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran. powd, 300 lb bbls.....lb.	....	.26	.25	.26	.20	.25
Tobias, 250 lb bbls.....lb.	.75	.80	.75	.80	.75	.80
Trichloroacetic bottles.....lb.	2.00	2.75	2.00	2.75	2.00	2.75
Kegs.....lb.	....	1.75	....	1.75	....	1.75
Tungstic, bbls.....lb.	1.35	1.45	1.35	1.70	1.40	1.70
Albumen, blood, 225 lb bbls...lb.	.45	.53	35	.53	.35	.43
dark.....bbls., lb.	.12	.17	.10	.17	.10	.17
Egg, edible .....lb.	.83	.92	.85	.92	.74	.90
Technical, 200 lb cases...lb.	.62	.66	.62	.66	.62	.66
Vegetable, edible.....lb.	.65	.70	.65	.70	.60	.70
Technical.....lb.	.50	.55	.50	.55	.50	.55
Alcohol Butyl, Normal, 50 gal drs c-1 wks.....lb.	....	.10½	....	.10½	....	.10½
Drums, 1-c-1 wks.....lb	....	.11	....	.11	....	.11
Tank cars wks.....lb.	....	.09½	....	.09½	....	.09½
Secondary tank .....lb.	....	.076	....	.076	....	....
drums carlots .....lb.	....	.086	....	.086	....	....
Amyl (from pentane) Tanks wks .....lb.	....	.143	....	.143	.143	.176
Capryl, tech, drums.....lb.	....	.85	....	.85	....	.85
Diacetone, tanks.....lb.	.15¾	.16¾	.15¾	.16¾	.15¾	.16¾
Ethyl, USP, 190 pf, 50 gal. bbls.....gal.	4.12½	4.24½a	4.12½	4.24½	2.44½	2.65
No. 5. *188 pf, 50 gal. drs. drums extra†.....gal.	....	.347*	....	.351*	....	*.385
No. S. D. 1, tanks .....gal.	....	.295	.29½	.304	....	.304
Furfuryl, tech., 500 lb. drs.lb.	....	.40	....	.40	.40	.45
Isobutyl, ref., gal. drs.....gal.	....	.75	....	.75	....	.75
Isopropyl, ref, gal drs.....gal.	....	.50	....	.50	.45	.50
Propyl Normal, 50 gal dr..gal.	....	.75	....	.75	....	.75
Aldehyde Ammonia, 100 gal drlb.	.80	.82	.80	.82	.80	.82
Aldol. 95%, l-cl dr.....lb.	....	.25	....	.25	....	....
c-l, dr.....lb.	....	.21	....	.21	....	....
Alpha-Naphthol, crude, 300 lb. bbls.....lb.	.65	.70	.65	.70	.65	.70
Alpha-Naphthylamine, 350 lb. bbls.....lb.	.32	.34	.32	.34	.32	.34
Alum Ammonia, lump, 400 lb bbls, 1-c-1 wks.....100 lb.	3.00	3.25	3.00	3.25	3.00	3.25
Chrome, 500 lb casks, wks .....100 lb.	7.00	7.25	6.50	7.25	4.50	6.50
Potash, lump, 400 lb casks wks.....100 lb.	3.00	3.50	3.00	3.50	3.00	3.50
Soda, ground, 400 lb bbls wks .....100 lb	3.50	3.75	3.50	3.75	3.50	3.75
Aluminum Metal, c-1 NY.100 lb.	22.90	24.30	22.90	24.30	22.00	24.30
Chloride Anhyd., 99%, wks.lb.	.07	.12	.07	.12	....	....
93% grade, wks.....lb.	.04	.08	.04	.08	....	....
Hydrate, 96%, light, 90 lb. bbls.....lb.	.13	.15	.13	.16½	.15	.16½
Palmitate, bbls.....lb.	.19	.20	.19	.20	....	....
Resinate, pp., bbls.....lb.	.12½	.14	.12½	.14	....	....
Stearate, 100 lb bbls.....lb.	.17	.18	.17	.18	.12½	.18
Sulfate, Iron, free, bags c-l wks.....100 lb.	1.90	1.95	1.90	1.95	1.90	1.95
Coml, bags c-l wks .100 lb.	1.35	1.50	1.35	1.50	1.25	1.50
Aminoazobenzene, 110 lb kegs lb.	....	1.15	....	1.15	....	1.15
Ammonia						
Ammonia anhydrous Com. tanks	.04½	.05½§	.04½	.05½§	.04½	.05½
Ammonia, anhyd. 100 lb cyl...lb.	.15½	.15½	.15½	.15½	.15½	.15½
Water, 26°, 800 lb dr del...lb.	.02½	.03	.02½	.03	.02½	.03
Ammonia, aqua 26° tanks.... NH cont.....	....	.05	....	.05	.....	.05
Ammonium Acetate .....lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls., f.o.b. plant .....100 lb.	....	5.15	....	5.15	....	5.15
Bifluoride, 300 lb bbls.....lb.	.15¾	.17	.15¾	.17	.15¾	.17
Carbonate, tech, 500 lb ca. .lb.	.08	.12	.08	.12	.08	.12
Chloride, white, 100 lb. bbls wks.....100 lb.	5.00	5.25	5.00	5.25	4.45	5.25
Gray, 250 lb bbls wks...lb.	5.25	5.75	5.25	5.75	5.25	5.75
Lump, 500 lb cks spot...lb.	.10	.11	.10	.11	.10	.11
Lactate, 500 lb bbls.....lb.	.15	.16	.15	.16	.15	.16
Linoleate.....lb.	....	.12	.11	.12	....	.11
Nitrate, tech, casks.....lb.	.03¾	.05	.03¾	.05	.03¾	.10
Oleate, drs.....lb.	....	.10	....	.10	....	.10
Persulfate, 112 lb kegs.....lb.	.20	.22½	.20	.22½	.20	.22½
Phosphate, tech, powd, 325 lb. bbls.....lb.	.08	.10	.08	.11½	.08½	.11½
Sulfate, bulk c-l.....100 lb.	....	1.25	....	1.25	1.00	1.25
Sulfocyanide, kegs.....lb.	....	.50	....	.50	.36	.50
Amyl Acetate, (from pentane) Tanks del.....lb.	....	.13½	....	.13½	...	13½
Tech., drs del.....lb.	.142	.149	.142	.149	.138	.149

« « *Recent* CHEMICAL *Developments* » »

V

1. Rectifies Cream Acidity

For correcting acidity in cream, Recto improves flavor, gives excellent body, reduces loss of fat in buttermilk, and saves time because it is quickly soluble and does not cake. It leaves no neutralizer taste and does not cause excessive foaming.

2. Synthetic Resin Varnishes

The use of Dipentene No. 122 is spreading rapidly among manufacturers of synthetic resin varnishes. This solvent reduces skinning and gelling in varnishes made from nearly all types of synthetic resins, and is especially effective in varnishes made from phenolic resins.

3. For Casting Metals

Wherever metals are cast, Truline Binder will help to make cores of superior strength and smoothness. Cores bonded with this material do not absorb moisture and, when the hot metal is poured around them, the binder burns out completely and the sand collapses.

4. Wide Viscosity Range

Tornesit, the new chlorinated rubber, resin-like product, is available in viscosities ranging from 6 to 1000 centiposes, and higher viscosities are in prospect. The most practical types now in use are 30 and 130 centiposes. The highest viscosities should prove valuable in thermoplastics as they mould well in the presence of solvent plasticizers.

5. Economical Road Building

Superior Concrete Special Silicate of Soda is available for curing concrete. It seals the surface, thereby aiding the curing of the concrete.

6. Rosins That Bleach

Hercules Pale Wood Rosins bleach at temperatures normally employed in varnish manufacture. In preparing pale varnishes, these rosins often replace paler grades of rosin formerly used, at a saving in cost. Their superior uniformity also allows more accurate standardization and control of quality.

7. Increases Luster, Flow

Hercosol No. 80 is a varnish and lacquer solvent made from pine oil under a patented process. Small quantities added to brushing and dipping lacquers and lacquer enamels improve the flexibility, luster, and flow.

8. Less Discoloring in Sun

The new M. D. Nitrocellulose discolors less upon exposure to sunlight after contact with iron containers than other types. Aside from this characteristic, its properties are the same as other nitrocellulose and it is available in all standard viscosities and solubilities.

More detailed information on any of the above subjects may be secured by filling in this coupon.

HERCULES POWDER COMPANY
INCORPORATED
Wilmington, Delaware

I am interested in items numbered:

.....

Name.....

Address.....

Company.....

IN-15-C

Amyl Acetate
Calcium Chloride
Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Secondary, tanks.....lb.	....	.09	....	.09	....	.09
Amyl Alcohol, see also Fusel Oil.						
Amyl Alcohol, sec.....lb.	....	.08½	.08½	.08½	....	....
Aniline Oil, 960 lb drs & tks..lb.	.15	.17½	.15	.17½	.14½	.16
Annatto, fine.....lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80%.....lb.	....	.75	....	.75	....	....
40%.....lb.	....	.18	....	.18	....	....
Anthraquinone, sublimed, 125 lb. bbls.....lb.	....	.45	....	.45	...	.45
Antimony, metal slabs, ton lots lb.	....	.07⅞	.07	.07⅞	.05½	.07½
Needle, powd, bbls.....lb.	.08	.09	.08	.09	.07	.09
Chloride, soln (butter of) cbys.....lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls.....lb.	.08	.11	.08	.11	.07½	.11
Salt, 63% to 65%, tins....lb.	.22	.24	.22	.24	.20	.24
Sulfuret, golden, bbls .....lb.	.16	.20	.16	.20	.16	.20
Vermillion, bbls.....lb.	.38	.42	.38	.42	.38	.42
Archil, conc, 600 lb bbls.....lb.	.21	.27	.21	.27	.20	.21
Double, 600 lb bbls.....lb.	.18	.20	.18	.20	.16	.17
Triple, 600 lb bbls.... ....lb.	.18	.20	.18	20	.16	.17
Argols, 80%, casks.....lb.	.15	.16	.15	.16	.12	.15
Crude, 30%, casks.....lb.	.08	.09	.08	.09	.06¾	.09
Aroclors, wks.....lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl.....lb.	.08¾	.09½	.08¾	.09½	....	....
Arsenic, Red. 224 lb kegs, cs..lb.	.15	.15½	.14	.15½	.09⅜	.14¼
White, 112 lb kegs.....lb.	.04	.05	.04	.05	.04	.05
Metal.....lb.	.40	.42	.40	.45	....	....
Asbestine, c-1 wks.....ton	13.00	15.00	13.00	15.00	13.00	15.00
Barium						
Barium Carbonate, precip, 200 lb. bags wks.....ton	56.50	61.00	56.50	61.00	56.50	61.00
Nat. (witherite) 90% gr. carlots wks bags.....ton	....	45.00	.....	45.00	.....	.....
Chlorate, 112 lb kegs NY..lb.	.15	.16	.15	.16	.13¾	.16
Chloride, 600 lb bbl wks...ton	72.00	74.00	72.00	74.00	61.50	74.00
Dioxide, 88%, 690 lb drs...lb.	.11	.13	.11	.13	.11	.13
Hydrate, 500 lb bbls.....lb.	.04¾	.05	.04¾	.05	.04½	.05
Nitrate, 700 lb casks.....lb.	....	.08¼	.....	.08¼	...	.07½
Barytes, Floated, 350 lb bbls wks.....ton	23.00	30.50	23.00	30.50	22.20	30.50
Bauxite, bulk, mines.....ton	5.00	6.00	5.00	6.00	5.00	6.00
Bayberry, bags.....lb.	.25	.30	.25	.30	.14½	.17
Beeswax, Yellow, crude bags..lb.	.21	.22	.16	.22	.13	.20
Refined, cases.....lb.	.26	.29	.21	29	.18	.26
White, cases.....lb.	.34	.37	.32	.37	.30	.35
Benzaldehyde, technical, 945 lb. drums wks.....lb.	.60	.65	.60	.65	.60	.65
Benzene, 90%, Industrial, 8000 gal tanks wks.....gal.	....	.19	.19	.20½	.20	.22
Ind. Pure, tanks works....gal.	....	.19	.19	.20½	.20	.22
Benzidine Base, dry, 250 lb. bbls.....lb.	.67	.69	.67	.69	.65	.67
Benzoyl, Chloride, 500 lb drs.lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech drs....lb.	....	.30	.....	30	...	.30
Beta-Naphthol, 250 lb bbl wk .lb.	....	.24	.....	.24	...	.24
Naphthylamine, sublimed, 200 lb bbls.....lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls .....lb.	.53	.58	.53	.58	.53	.58
Bismuth, metal.....	....	1.30	....	1.30	85	1.30
Bismuth Subnitrate	1.55	1.60	1.40	1.60	.95	1.40
Blackstrap, cane, (see Molasses, Blackstrap)						
Blanc Fixe, 400 lb bbls wks..ton	42.50‡	70.00	42.50‡	70.00	42.50	75.00
Bleaching Powder, 800 lb drs c-1 wks contract....100 lb.	....	1.90	.....	1.90	1.75	1.90
Blood, Dried, fob, NY.....Unit	....	3.00	2.60	3.25	1.55	2.75
Chicago, high grade.....Unit	....	2.50	2.25	3.10	....	....
S. American shipt.....Unit	....	3.00	2.90	3.15	1.90	3.00
Blues, Bronze Chinese Milori Prussian Soluble.....lb.	.35½	.37½	.35½	.37½	...	.35
Bone, raw, Chicago.....ton	21.00	22.00	20.00	25.00	19.00	28.00
Bone Ash, 100 lb kegs.....lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls.....lb.	.05½	.08½	.05½	.08½	.05½	.08
Meal, 3% & 50%, Imp....ton	....	17.50	16.00	20.00	18.00	27.50
Borax, bags.....lb.	.018	.02	.018	.02	.018	.02
Bordeaux, Mixture, 16% pwd.lb.	.10½	.14	.10½	.14	.11½	.13
Paste, bbls.....lb.	.10½	.14	.10½	.14	.10½	.13
Brazilwood, sticks, shpmt.....lb.	26.00	28.00	26.00	28.00	26.00	28.00
Bromine, cases.....lb.	.36	.43	.36	.43	.36	.43
Bronze, Aluminum, powd blk..lb.	.50	.75	.50	.75	.50	.75
Gold bulk.....lb.	.40	.55	.40	.55	.40	.55
Butanes, com 16.32° group 3 tanks.....lb.	.02¾	.04	.02¾	.04	.02¾	.04
Butyl, Acetate, normal drs...lb.	....	.11	.....	.11	.11	.139
Tank, wks.. .....lb.	....	.10	.....	.10	.10	.124
Secondary tanks, wks.....lb.	....	.08	....	.08	....	....
Aldehyde, 50 gal drs wks...lb.	.35	.36	.35	.36	.31½	.36
Carbitol see Diethylene Glycol Mono (Butyl Ether)	....	....	.....	.....	....	....
Cellosolve (see Ethylene glycol mono butyl ether).....						
Furoate, tech.. 50 gal. dr..lb.	....	.60	.....	.60	.50	.60
Lactate, drums .....lb.	....	.29	....	.29	....	....
Propionate, drs.....lb.	.20	.22	.20	.22	.20	.22
Stearate, 50 gal drs.. .....lb.	.25	.25½	.25	.25½	.25	.25
Tartrate, drs.....lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes.....lb.	.70	.75	.65	.75	.65	.75
Calcium, Acetate, 150 lb bags c-1.....100 lb.	....	3.00	.....	3.00	2.50	3.00
Arsenate, 100 lb bbls c-1 wks.....lb.	.05	.05½	.05	.07	.05½	.07
Carbide, drs.....lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bags c-1.....lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-1 wks.....ton	....	19.50	.....	19.50	19 50	21.00
Solid, 650 lb drs c-1 fob wks .....ton	....	17.50	.....	17.50	17.50	18.00
Ferrocyanide, 350 lb. bbls. f.o.b. wks.....lb.	....	.17	.....	.17	.17	.17

†F. O. B. destination, 1931 prices are works prices.
‡Lowest price is for pulp; highest for high-grade precipitate.

Current

Calcium Furoate
Crotonaldehyde

	Current Market		1934 Low	1934 High	1933 Low	1933 High
Calcium Furoate, tech, 100 lb. drums	lb.	....	.30	.....	.30	....	.30
Nitrate, 100 lb bags	ton	....	26.50	.....	26.50	24.00	26.50
Palmitate, bbls	lb.	.19	.20	.19	.20	.16	.19
Peroxide, 100 lb drs	lb.	....	1.25	.....	1.25	....	1.25
Phosphate, tech, 450 lb bbls.	lb.	.07½	.08	.07½	.08	.07½	.08
Resinate, precip., bbls	lb.	.13	.14	.13	.14	....	....
Stearate, 100 lb. bbls	lb.	.17	.18	.17	.18	.12½	.18
Camphor, slabs	lb.	.53	.54	.52	.59	.35½	.59
Powder	lb.	.53	.54	.52	.59	.38	.59
Camwood, Bark, ground bbls.	lb.	.16	.18	.16	.18	.16	.18
Candelilla Wax, bags	lb.	.14	.14½	.10¼	.14½	.09	.11
Carbitol, (See Diethylene Glycol Mono Ethyl Ether)	....	....	.....	.....	....	...
Carbon, Decolorizing, drums c-1	lb.	.08	.15	.08	.15	.08	.15
Black, 100-300 lb cases 1c-1 NY	lb.	.07	.08¼	.06½	.08½	.06	.12
Bisulfide, 500 lb drs 1c-1 NY	lb.	.05½	.06	.05½	.06	.05½	.06
Dioxide, Liq. 20-25 lb cyl.	lb.	....	.06	.. ..	.06	....	.06
Tetrachloride, 1400 lb drs delivered	lb.	.05½	.06	.05½	.06	.05½	.07
Carnauba Wax, Flor, bags	lb.	.37	.38	.32	.38	.23	.33
No. 1 Yellow, bags	lb.	.33	.34	.30	.36	.20	.35
No. 2 N Country, bags	lb.	Nominal		.20	.23	.14	.20
No. 3 N. C.	lb.	.20	.21½	.16¼	.21½	.11½	.17
No. 3 Chalky	lb.	.20	.21½	.16	.21½	.12	.17
Casein, Standard, Domestic ground	lb	.12½	.13	.11½	.13	.06½	.15
80-100 mesh carlots, bags	lb.	.13½	.14	.13	.14	....	....
Cellosolve (see Ethylene glycol mono ethyl ether)							
Acetate (see Ethylene glycol mono ethyl ether acetate)							
Celluloid, Scraps, Ivory cs	lb.	.13	.14	.13	.14	.13	.15
Shell, cases	lb.	.18	.20	.18	.20	.18	.20
Transparent, cases	lb.	....	.16	.....	.16	....	.16
Cellulose, Acetate, 50 lb kegs.	lb.	.80	.90	.80	.90	.80	.90
Chalk, dropped, 175 lb bbls.	lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks.	lb.	.03	.04	.03	.04	.02	.03½
Light, 250 lb casks	lb.	.03	.04	.03	.04	.02½	.03½
Charcoal, Hardwood, lump, bulk wks	bu.	.18	.19	.18	.19	.18	.19
Willow, powd, 100 lb bbl. wks	lb.	.06	.06½	.06	.06½	.06	.06½
Wood, powd, 100 lb bbls.	lb.	.04	.05	.04	.05	.04	.05
Chestnut, clarified bbls wks.	lb.	.01⅝	.01¾	.01⅝	.01¾	.01½	.02
25% tks wks	lb.	.01½	.01½	.01½	.01½	.012	.01½
Powd, 60%, 100 lb bgs wks.	lb.	....	.04⅞	.....	.04⅞	....	.04⅞
Powd, decolorized bgs wks.	lb.	.05	.05½	.05	.05½	.04⅞	.05
China Clay, lump, blk mines.	ton	8.00	9.00	8.00	9.00	8.00	9.00
Powdered, bbls	lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls wks	ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, bulk	ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine, cyls 1c-1 wks contract	lb.	.07	.08½	.07	.08½	.07	.08½
cyls, cl., contract	lb.	....	.05½†	.....	.05½†	....	.05½
Liq tank or multi-car lot cyls wks contract	100 lb.	....	1.85	.....	1.85	1.75	1.85
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks	lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs.	lb.	....	.20	.....	.20	.15	.20
USP, tins	lb.	....	.30	.....	.30	....	....
Chloropicrin, comml cyls	lb.	.90	1.25	.90	1.25	.90	1.35
Chrome, Green, CP	lb.	.28	.29	.28	.29	.28	.29
Commercial	lb.	.06½	.10	.06½	.10	.06½	.10
Yellow	lb.	.15	.16	.15	.16	.14	.16
Chromium, Acetate, 8% Chrome bbls	lb.	.05	.05¾	.05	.05¾	.04¾	.05¾
20° soln, 400 lb bbls	lb.	....	.05½	.....	.05½	....	.05½
Fluoride, powd, 400 lb bbl.	lb.	.27	.28	.27	.28	.27	.28
Oxide, green, bbls	lb.	.22	.23	.22	.23	.19	.23
Coal tar, bbls	bbl.	8.50	9.00	8.50	9.00	.50	9.00
Cobalt Acetate, bbls	lb.	.75	.80	.75	.80	....	....
Carbonate tech., bbls	lb.	1.34	1.40	1.34	1.40	....	....
Hydrate, bbls	lb.	1.66	1.76	1.66	1.76	....	....
Linoleate, paste, bbls	lb.	.39	.40	.39	.40	....	....
Resinate, fused, bbls	lb.	....	.12½	.....	.12½	....	....
Precipitated, bbls	lb.	.41	.42	.41	.42	.41	.42
Cobalt Oxide, black, bags	lb.	1.25	1.35	1.25	1.35	1.15	1.35
Cochineal, gray or black bag.	lb.	.36	.42	.36	.42	.36	.42
Teneriffe silver, bags	lb.	.37	.43	.37	.43	.37	.43
Copper, metal, electrol	100 lb.	....	8.50	7.87½	8.50	5.00	9.00
Carbonate, 400 lb bbls	lb.	....	.08¼	.....	.08¼	.07	.08
52-54% bbls	lb.	....	.16¼	.....	.16¼	.15½	.17½
Chloride, 250 lb bbls	lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs	lb.	.37	.38	.37	.40	.39	.40
Oleate, precip., bbls	lb.	....	.20	.....	.20	....	....
Oxide, red, 100 lb bbls	lb.	.15	.17	.12½	.17	.14¾	.15
Resinate, precip., bbls	lb.	.18	.19	.18	.19	....	....
Stearate, precip., bbls	lb.	.35	.40	.35	.40	....	....
Sub-acetate verdigris, 400 lb bbls	lb.	.18	.19	.18	.19	.18	19
Sulfate, bbls c-1 wks	100 lb.	....	3.85	3.75	3.85	3.00	3.75
Copperas, crys and sugar bulk c-1 wks bags	ton	14.00	14.50	14.00	14.50	14.00	14.50
Corn Syrup, 42 deg., bbls.	100 lb.	....	3.04	.....	3.04	2.61	3.04
43 deg., bbls	100 lb.	....	3.09	.....	3.09	2.66	3.09
Cotton, Soluble, wet, 100 lb bbls	lb.	.40	.42	.40	.42	.40	.42
Cottonseed, S. E. bulk c-1	ton		*(See Oils and Fats News Section)*				
7% Amm., bags mills	ton	13.25	38.00	13.25	38.00	13.25	38.00
Cream Tartar, USP, powd., & gran., 300 lb. bbls	lb.	.19½	.19½	.17½	.19½	.14½	.17½
Creosote, USP, 42 lb cbys	lb.	.45	.47	.45	.47	.40	.47
Oil, Grade 1 tanks	gal.	.11	.12	.11	.12	.11	.12
Grade 2	gal.	.10	.12	.10	.12	.10	.12
Grade 3	gal.	.09	.12	.09	.12	.09	.12
Cresol, USP, drums	lb.	....	.11	.....	.11	.10½	.11
Crotonaldehyde, 98% 50 gal dr.	lb.*	.26	.30	.26	.30	.32	.36

†Delivered. *Lower price is for carlots.

Cudbear
Fustic

Prices

		Current Market	1934 Low	1934 High	1933 Low	1933 High
Cudbear, English	lb.	.19	.25	.19	.25	.16	.25
Cutch, Rangoon, 100 lb bales	lb.	....	.02¾	.....	.02¾	.02½	.03
Borneo, Solid, 100 lb bale	lb.	....	.04½	.....	.04½	.02½	.04½
Philippine, 100 lb. bale	lb.	.03½	.04½	.03½	04½	....	....
Cyanamide, bags c-l frt allowed Ammonia unit		....	1.07½	.....	1.07½	.97½	1.07½
Dextrin, corn, 140 lb bags	100 lb.	3.62	3.82	3.62	3.82	2.89	3.84
British Gum, bags	100 lb.	3.87	4.07	3.87	4.07	3.89	3.92
White, 140 lb bags	100 lb	3.47	3.67	3.47	3.67	2.94	3.79
Potato Yellow, 220 lb bgs	lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.09
White, 220 lb bags lc-1	lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 lb bags lc-1	lb.	.06¾	.07¾	.06¾	.07¾	.06¾	.08
Diamylether, wks., drums	lb.	.60	.77	.60	.77	....	....
Diamylphthalate, drs wks	gal.	....	.20½	.....	.20½	....	....
Dianisidine, barrels	lb.	2.35	2.45	2.35	2.45	2.35	2.70
Dibutylphthalate, wks	lb.	.20½	.21	.20½	.21	.20½	.22
Dibutyltartrate, 50 gal drs	lb.	.29½	.31½	.29½	.31½	.29½	.21
Dichlorethylene, drums	gal.	.29	....	.29	....	....	....
Dichlorœthylether, 50 gal drs	lb.	....	.21	.....	.21	.16	.21
Dichloromethane, drs wks	lb.	....	.15	....	.15	....	....
Diethylamine, 400 lb drs	lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylcarbonate, com. drs	lb.	....	.35	.....	.35	....	....
90% grade, drs	lb.	....	.25	.....	.25	....	....
Diethylaniline, 350 lb drs	lb.	.52	.55	.52	.55	.52	.55
Diethyleneglycol, drs	lb.	.14	.16	.14	.16	.14	.16
Mono ethyl ether, drs	lb.	.15	.16	.15	.16	.15	.16
Mono butyl ether, drs	lb.	....	.26	.....	.26	....	.26
Diethylene oxide, 50 gal drs	lb.	.26	.27	.26	.27	.26	.27
Diethylorthotoluidin, drs	lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb. drums	lb.	.26	.27	.26	.27	.20	.26
Diethylsulfate, technical, 50 gal drums	lb.	....	....	....	....	....	....
Digtycol Oleate, bbls	lb.	....	.16	.....	.16	....	....
Dimethylamine, 400 lb drs, pure 25 & 40% sol. 100% basis	lb.	....	1.20	.....	1.20	....	....
Dimethylaniline, 340 lb drs	lb.	.29	.30	.29	.30	.25	.28
Dimethyl phthalate drs	lb.	....	.24½	.....	.24½	....	....
Dimethylsulfate, 100 lb drs	lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls	lb.	.17	.19½z	.17	.19½z	....	.18
Dintrochlorobenzene, 400 lb bbls	lb.	.14½	.15½	.14½	.15½	.13	.15
Dinitronaphthalene, 350 lb bbls	lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls	lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls	lb.	.15½	.16½	.15½	.16½	.15	.17
Dioxan (See Diethylene Oxide)		....	....	.....	....	....	....
Diphenyl	lb.	.15	.25	.15	.25	.15	.40
Diphenylamine	lb.	.31	.34	.31	.34	.31	.34
Diphenylguanidine, 100 lb bbl	lb.	.36	.37	36	.37	.30	.37
Dip Oil, 25%, drums	lb.	.23	.25	.23	.25	.23	.25
Divi Divi pods, bgs shipmt	ton	....	36.00	.....	36.00	26.00	36.00
Extract	lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb cases	lb.	.44	.45	.40	.45	.40	.43
Epsom Salt, tech, 300 lb bbls c-l NY	100 lb.	....	2.20	.....	2.20	....	2.20
Ether, USP anaesthesia 55 lb. drs.	lb.	....	.24	.....	.24	.22	.24
(Conc)	lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal. drums	lb.	.07‡x	.08	.07‡x	.08	.07	.08
Synthetic, wks, drums	lb.	.08	.09	.08	.09	....	....
Ethyl Acetate, 85% Ester tanks	lb.	.07½	.08	.07½	.08	.07½	.09
drums	lb.	.08½	.09	.08½	.09	.08½	.10
Anhydrous, tanks	lb.	.09	.10	.09	.10	.09	.10
drums	lb.	.10	.10½	.10	.10½	.10	.10½
Acetoacetate, 50 gal drs	lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs	lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drums	lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drums	lb.	....	.24	.....	.24	.22	.24
Chlorocarbonate cbys	lb.	....	.30	.....	.30	....	.30
Crotonate, drums	lb.	1.00	1.25	1.00	1.25	....	....
Ether, Absolute, 50 gal drs	lb.	.50	.52	.50	.52	.50	.52
Furoate, 1 lb tins	lb.	....	1.00	.....	1.00	1.00	5.00
Lactate, drums works	lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs	lb.	....	.12½	.....	.12½	....	.12½
Oxalate, drums works	lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks	lb.	.30	.30½	.30	.30½	.30	.30½
Ethylene Dibromide, 60 lb dr.	lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys. chloro, cont	lb.	.75	.85	75	.85	.75	.85
Dichloride, 50 gal drums	lb.	.05½	.06½	.05½	.06½	.05	.09
Glycol, 50 gal drs wks	lb.	.26	.28	.26	.28	.25	.28
Mono Butyl Ether drs wks.		....	.20	.....	.20	....	.20
Mono Ethyl Ether drs wks		.15	.17	.15	.17	.15	.17
Mono Ethyl Ether Acetate dr. wks		.16½	.18	.16½	.18	.16½	.18
Mono Methyl Ether, drs.	lb.	.21	.23	.21	.23	.21	.23
Stearate		.18	.18	.18	.18	.18	.18
Oxide, cyl	lb.	....	.75	.....	.75	....	.75
Ethylidenaniline	lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, bulk pottery	ton	....	14.50	.....	14.50	14.00	16.50
Powdered, bulk works	ton	13.50	14.50	13.50	14.50	13.50	14.50
Ferric Chloride, tech, crystal 475 lb bbls	lb.	.05	.07½	.05	.07½	.04½	.07½
Fish Scrap, dried, wks	unit	....	Nom.	.....	2.50*	1.85	2.75*
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis	unit	....	Nom.	.....	2.50†	1.85	2.50†
Fluorspar, 98%, bags		28.00	35.50	28.00	35.50	28.00	35.50
Formaldehyde, aniline, 100 lb. drums	lb.	.37½	.42	.37½	.42	.37½	.42
USP, 400 lb bbls wks	lb.	.06	.07	.06	.07	.06	.07
Fossil Flour	lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, bulk, mines	ton	15.00	20.00	15.00	20.00	15.00	20.00
Imp. powd c-l bags	ton	24.00	30.00	24.00	30.00	24.00	30.00
Furfural (tech.) drums wks,	lb.	.10§	.15	.10§	.15	.10	.15
Furfuramide (tech) 100 lb dr.	lb.	....	.30	.....	.30	....	.30
Furfuryl Acetate, 1 lb tins	lb.	....	5.00	.....	5.00	....	5.00
Fusel Oil, 10% impurities	lb.	.16	.18	.16	.18	.14½	.18
Fustic, chips	lb.	.04	.05	.04	.05	.04	.05

*& 10; †& 50 xTanks 2c lower.
‡Higher price, refined. §Tanks, 1c lower zHigher price is for purified.

Current

Fustic
Hoof Meal

	Current Market		1934 Low	1934 High	1933 Low	1933 High
Crystals, 100 lb boxes.....lb.	.20	.23	.20	.23	.18	.23
Liquid 50°, 600 lb bbls.....lb.	.08½	.12	.08½	.12	.07	.10
Solid, 50 lb boxes.....lb.	.16	.18	.16	.18	.14	.18
Sticks.....ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls.....lb.	.42	.43	.42	.43	.42	.43
Gall Extract.....lb.	.18	.20	.18	.20	.18	.20
Gambier, common 200 lb cs..lb.	.04½	.05½	.04	.05½	.03	.07
Singapore cubes, 150 lb bg..lb.	.05	.05½	.05	.07	.05½	.08
Gelatin, tech, 100 lb cases.....lb.	.45	.50	.45	.50	.45	.50
Glauber's Salt, tech, c-l wks. .....100 lb.	1.10	1.30	1.10	1.30	1.00	1.70
Glucose (grape sugar) dry 70-80° bags c-l NY.....100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb bags .....100 lb.	....	2.33	.....	2.33	....	2.33
Glue, bone, com.grades, c-l, bgs. lb.	.08	.12½	.08	.12½	....	....
Better grades, c-l, bags..lb.	.12½	.16	.12½	.16	....	....
Casein, kegs.....lb.	.18	.22	.18	.22	....	....
Hide, high grade, c-l, bags lb.	.23	.28	.23	.28	....	....
Medium grade, c-l, bags lb.	.19	.23	.19	.23	....	....
Low grade, c-l, bags.....lb.	.13½	.19	.13½	.19	....	....
Glycerin, CP, 550 lb drs.....lb.	.12½	.13	.11	.13	.10½	.11
Dynamite, 100 lb drs.....lb.	.12¼	.13	.10	.13	.07½	.10¼
Saponification, tanks.....lb.	.09½	.09½	.06¾	.09½	.05	.08
Soap Lye, tanks.....lb.	.08½	.08½	.06¾	.08½	.04	.06½
Glyceryl Stearate, bbls.....lb.	....	.18	.....	.18	.17	.18
Graphite,						
Crystalline, 500 lb. bbls...lb.	.04	05	.04	.05	.04	.05
Flake, 500 lb bbls.....lb.	.08	.16	.08	.16	.08	.16
Amorphous bbls.....lb.	.03	.04	.03	.04	.03	.04
Gums						
Gum Accroides, Red, coarse and fine 140-150 lb bags.....lb.	.03¾	.04½	.03¾	.04½	.03¾	.04½
Powd, 150 lb bags.....lb.	.06	.06½	.06	.06½	.06	.06½
Yellow, 150-200 lb bags...lb.	.18	.20	.18	.20	.18	.20
Aloes, Barbadoes .....lb.	.87	.90	.85	.90	.85	.90
Animi (Zanzibar) bean & pea 250 lb cases.....lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases.....lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts.....lb.	.08¾	.09	.07¾	.09	.05½	.08¼
Asphaltum, Barbadoes (Manjak) 200 lb bags.....lb.	.03	.06	.03	.06	.03	.05
Egyptian, 200 lb cases.....lb.	.13	.15	.13	.15	.13	.15
Ester, light.....lb.	.06½	.07	.06	.07	....	....
Gamboge, pipe, cases.....lb.	.60	.65	.57	.65	.42	.65
Powdered, bbls.....lb.	.70	.75	.67	.75	.50	70
Gilsonite Selects, 200 lb bags .....ton	30.50	32.90	30.50	32.90	30.50	32.90
Damar Batavia standard 136, lb. cases.....lb.	.12½	.13½	.12½	.13½	.08½	.15½
Batavia Dust, 160 lb bags.....lb.	.05½	.06	.05½	.07	.04	.07½
E Seeds, 136 lb cases.....lb.	.08½	.09	.08	.09½	.05½	.09½
F Splinters, 136 lb cases and bags.....lb.	.05½	.06	.05½	.06	.05½	.06
Singapore, No. 1, 224 lb cases .lb.	.16½	.17	.16½	.18	.09½	.18
No. 2, 224 lb cases.....lb.	.10¼	.10½	.10¼	.11	.07	.11½
No. 3, 180 lb bags.....lb.	.05¼	.06	.05¼	.07	.04½	.07½
Benzoin Sumatra, U. S. P. 120 lb. cases.....lb.	.21	.23	.21	.23	.17	.23
Copal Congo, 112 lb bags, clean opaque.....lb.	.26	.26½	.26	.28	.16½	.28
Dark, amber.....lb.	.08¾	.09	.08¾	.10½	.06	.10½
Light, amber.....lb.	.14¾	.14¾	.14¾	.19	.08	.19
Water, white.....lb.	.45	.46	.45	.48	.37	.48
Kino, tins.....lb.	.75	.80	.75	.80	....	....
Mastic.....lb.	.36½	.37	.35	.40	.26½	.40
Manila 180-190 lb baskets						
Loba A.....lb.	.11¾	.11¾	.11¾	.14½	.09	.13½
Loba B.....lb.	.11¼	.11¾	.11¼	.13½	.08	.13
Loba C.....lb.	.10½	.11	.10½	.12	.07	.12
M A Sorts.....lb.	.06¾	.07	.06½	.07½	.05	.07
D B B Chips.....lb.	.08½	.09	.08½	.09½	.05¾	.09½
East Indies chips, 180 lb bags lb.	.04½	.05	.04½	.05	.04	.07
Pale bold, 224 lb cs.....lb.	.16	.17	.16	.17	.05½	.17
Pale nubs, 180 lb bags...lb.	.10½	.10½	.10½	.13	.05	.13
Pontianak, 224 lb cases.....						
Bold gen No. 1.....lb.	.17⅜	.18½	.17½	.19	.14	.18½
Gen. chips spot.....lb.	.07⅜	.08¼	.07¼	.08½	.05	.08
Elemi, No. 1, 80-85 lb cs.....lb.	.09½	.10	.09¼	.11½	.09	.12½
No. 2, 80-85 lb cases.....lb.	.09¼	.09½	.09¼	.11½	.08½	.12
No. 3, 80-85 lb cases.....lb.	.08	.08½	.08	.08½	.08	.08½
Ghatti, sol. bags.....lb.	.09	.09½	.09	.09½	.06	.09½
Karaya, pow. bbls xxx.....lb.	.23	.25	.23	.25	....	....
xx.....lb.	.15	.16	.15	.16	....	....
No. 1.....lb.	.10	.11	.10	.11	....	....
No. 2.....lb.	.08	.09	.08	.09	....	....
Kauri, 224-226 lb cases No. 1.lb.	.20	.25	.20	.25	.20	.25
No. 2 fair pale.....lb.	.12½	.16	.12½	.16	.12½	.16
Brown Chips, 224-226 lb. cases.....lb.	.06½	.08½	.06½	.08½	.06½	.12
Bush Chips, 224-226 lb. cases.....lb.	.22	.24	.22	.24	.22	.24
Pale Chips, 224-226 lb cases .....lb.	.11½	.14	.11	.14	.11	.14
Sandarac, prime quality, 200 lb. bags & 300 lb. casks.....lb.	.46	.46½	.44	.50	.21	.50
Senegal, picked bags.....lb.	.17	.18	.17	.18	....	....
Sorts.....lb.	.08¼	.08¾	.08	.08¾	....	....
Thus, bbls.....280 lbs.	....	9.50	.....	9.50	....	....
Strained.....280 lbs.	....	9.50	.....	9.50	....	....
Tragacanth, No. 1 bags.....lb.	1.15	1.20	1.00	1.20	.65	1.00
Yacca, bags.....lb.	....	.03½	.03½	.04	....	....
Hematine crystals, 400 lb bbls lb.	.16	.18	.16	.18	.10	.18
Paste, 500 bbls.....lb.	....	.11	.....	.11	....	.11
Hemlock 25%, 600 lb bbls wks lb.	.03½	.04½	.03½	.04½	.03½	.04½
Bark.....ton	....	16.00	.....	16.00	....	16.00
Hexalene, 50 gal drs wks.....lb.	....	.30	.....	.30	....	.30
Hexane, normal 60-70° C. Group 3, tanks.....gal.	....	.14	.....	.14	....	....
Hexamethylenetetramine, drs lb.	.37	.39	.37	.39	....	....
Hoof Meal, f.o.b. Chicago...unit	....	2.10	1.85	2.60	.75	1.75
South Amer. to arrive....unit	1.65	1.75	1.65	1.75	1.40	1.75

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Hydrogen Peroxide, 100 vol, 140 lb cbys.....lb.	.20	.21	20	.21	.20	.21
Hydroxyamine Hydrochloride lb.	....	3.15	.....	3.15	....	3.15
Hypernic, 51°, 600 lb bbls....lb.	.17	.20	.17	.20	.11	.20
Indigo Madras, bbls.....lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drums.....lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid.....lb.	....	.12	.....	.12	....	.12
Iodine, crude.....per kilo	....	15s 1d	.....	15s 1d	....	....
Resublimed, kegs.....lb.	2.25	2.30	2.25	2.30	2.10	3.40
Irish Moss, ord. bales.....lb.	.07	.08	.07	.08	....	....
Bleached, prime, bales.....lb.	.14	.15	.14	.15	....	....
Iron Acetate Liq. 17°, bbls....lb.‡	.03	.04	.03	.04	....	....
Iron Chloride see Ferric or Ferrous						
Nitrate, kegs.....lb.	.09	.10	.09	.10	.09	.10
Coml, bbls.....100 lb.	2.75	3.25	2.75	3.25	2.50	3.25
Oxide, English.....lb.	.08½	.09	.08½	.09	.04	.07
Isopropyl Acetate, tanks.....lb.	....	.07	.07	.07	....	....
Japan Wax, 224 lb cases.....lb.	.06¾	.07	.06	.08	.05½	.08
Keiselguhr, 95 lb bgs NY.....						
Brown.....ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate, bbls wks...100 lb.	....	9.50	.....	9.50	8.50	9.50
White crystals, 500 lb bbls wks.....100 lb.	....	10.50	.....	10.50	9.50	10.50
Arsenate, drs cl-lcl., wks...lb.	.08	.15	.07	.18	.09	.10½
Dithiofuroate, 100 lb dr....lb.	....	1.00	.....	1.00	....	1.00
Linoleate, solid bbls.....lb.	.26	.26½	.26	.26½	....	....
Metal, c-l NY.....100 lb.	....	4.25	4.00	4.25	3.00	4.50
Nitrate, 500 lb bbls wks....lb.	.10	.14	.10	.14	.10	.14
Oleate, bbls.....lb.	.15	.16	.15	.16	.15	.16
Lead Oxide Litharge, 500 lb. bbls.....lb.	....	.06¾	.....	.06¾	.05½	.07
Red, 500 lb bbls wks.....lb.	....	.07¼	.....	.07¼	.06½	.08
Resinate, precip., bbls....lb.	.18	.18½	.18	.18½	....	....
Stearate, bbls.....lb.	.22	.23	.22	.23	....	....
White, 500 lb bbls wks...lb.	.06½	.07	.06½	.07	.06	.07
Sulfate, 500 lb bbls wk....lb.	....	.06	.....	.06	.05½	.06
Lime, ground stone bags.....ton	....	4.50	.....	4.50	....	4.50
Live, 325 lb bbls wks.....bbl.	....	1.70	.....	1.70	....	....
Lime Salts, see Calcium Salts						
Lime-Sulfur soln bbls.....gal.	.14	.33	.14	.33	.15	.17
Linseed cake, bulk.....ton	....	27.00	24.50	27.00	17.50	27.50
Linseed Meal.....ton	....	37.00	.....	37.00	28.00	37.00
Lithopone, 400 lb bbls lc-l wks lb.	.04¾	.05	.04¾	.05	.04¾	.05
Logwood, 51°, 600 lb bbls....lb.	.08½	.12½	.08½	.12½	.05	.12½
Solid, 50 lb boxes.....lb.	.14½	.17½	.14½	.17½	.08	.17½
Sticks.....ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch.....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl...ton	60.00	65.00	55.00	65.00	46.00	65.00
Magnesium Carb, tech, 70 lb. bags NY.....lb.	....	.06½	.....	.06½	.05¾	.06½
Chloride flake, 375 lb. drs c-l wks.....ton	36.00	39.00	34.00	39.00	34.00	36.00
Imported shipment.....ton	31.75	33.00	31.75	33.00	31.75	33.00
Fused, imp., 900 lb bbls NY ton	....	31.00	.....	31.00	....	31.00
Fluosilicate, crys, 400 lb bbls. wks.....lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls.lb.	....	.42	.....	.42	....	.42
Heavy, 250 lb bbls.....lb.	....	.50	.....	.50	....	.50
Palmitate, bbls.....lb.	.21	.22	.21	.22	....	....
Peroxide, 100 lb cs.....lb.	1.20	1.25	1.20	1.25	1.00	1.25
Silicofluoride, bbls.....lb.	.10	.11	.10	.11	.08½	.11
Stearate, bbls.....lb.	.19	.20	.19	.20	.16½	.20
Manganese Borate, 30%, 200 lb. bbls.....lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb casks.....lb.	.07	.08	.07	.08	.07	.08
Dioxide, tech (peroxide) drs lb.	.03½	.06	.03½	.06	.03½	.06
Linoleate, lig. drums.....lb.	.18	.19	.18	.19	....	....
Resinate, fused, bbls.....lb.	.08½	.08½	.08½	.08½	....	....
precip., bbls.....lb.	.11½	.12½	.11½	.12½	....	....
Sulfate, 550 lb drs NY.....lb.	....	.08	.....	.08	.07	.08
Mangrove 55%, 400 lb bbls...lb.	....	.04	.....	.04	....	.04
Bark, African.....ton	....	28.00	27.00	31.00	22.00	31.00
Marble Flour, bulk.....ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercuric chloride.....lb.	....	.88	.82	.88	.67	.87
Mercury metal.....76 lb flask	76.00	78.00	66.50	79.00	48.00	69.00
Meta-nitro-aniline.....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-para-toluidine 200 lb. bbls.....lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb. bbls.....lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb. bbls.....lb.	.67	.69	.67	.69	.67	.69
Methanol, (Wood Alcohol).....						
*Crude, tanks.....gal.	....	.25	.....	.25	.20	.20
95% tanks.....gal.	.33	.35	.33	.35	.33	.35
97% tanks.....gal.	.34	.39	.34	.39	.34	.39
*Pure, Synthetic drums cars gal.	....	.40	.....	.40	.37½	.40
*Synthetic tanks.....gal.	....	.35½	.....	.35½	....	.35½
*Denat. grade, tanks.....gal.	....	.43	.40	.43	.35	.40
Methyl Acetate drums 82% gal.	.12	.13	12	.13	.12	.13
99% tanks.....gal.	....	.15	.....	.15	....	.15
Acetone, drums.....gal.	.54½	.57	.54½	.57	.42	.57
Hexyl Ketone, pure.....lb.	....	1.20	.....	1.20	....	1.20
Anthraquinone.....lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tanks.....lb	....	.10½	.10½	.10½	....	....
Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	....	....	.....	....	....	....
Chloride, 90 lb cyl.....lb.	.45	.45	.45	.45	.45	.45
Ethyl Ketone, tanks.....lb.	....	.07½	.07½	.07½	....	....
Mica, dry grd. bags wks.....lb.	65.00	80.00	65.00	80.00	65.00	80.00
Michler's Ketone, kegs.....lb.	....	2.50	.....	2.50	2.50	3.00
Molasses, blackstrap, tanks f.o.b. N. Y.....gal.	.08½	.09	.06½	.09	.04½	.07
Monochlorobenzene, drums, see Chlorobenzene, mono.....lb.						
Monomethylparaminosulfate 100 lb drums.....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Montan Wax, crude, bags....lb.	.10½	.11	.10	.11	.03¾	.10
Myrobalans 20%, liq bbls....lb.	.03¾	.04½	.03¾	.04½	.03½	.04½
50% Solid, 50 lb boxes.....lb.	.06	.06½	.06	.06½	.05	.06½

*delivered basis (east of Miss. River) †As of Sept. 1, $2.56.
‡Higher price is for lcl quantities.

Current

Myrobalans
Phenyl-Alpha-Naphthylamine

	Current Market	1934 Low	1934 High	1933 Low	1933 High
J1 bags.....ton	....	27.50	27.00	32.00	27.00	35.00
J2 bags.....ton	....	16.50	16.50	18.50	15.50	22.75
R2 bags.....ton	16.25	16.50	16.25	18.00	15.00	22.00
Naphtha, v.m.& p. (deodorized) tanks, Group 3 tanks...gal.	.06⅞	.07¼	.06⅞	.07¼	....	....
Bayonne, tanks.....lb.	....	.09½	.....	.09½	.08½	.09½
Naphthalene balls, 250 lb bbls wks.....lb.	.06	.07	.06	.07	.05½	.07
Crude, imp.....100 lb.	....	1.75	1.75	2.15	1.75	2.15
Crushed, chipped bgs wks...lb.	....	.05	.....	.05	....	.05
Flakes, 175 lb bbls wks.....lb.	....	.07¼	.....	.07¼	....	.07¼
Nickel Chloride, bbls.....lb.	.18	.19	.18	.19	.17	.19
Oxide, 100 lb kegs NY.....lb.	.35	.37	.35	.37	.35	.37
Salt bbl. 400 bbls lb NY...lb.	.11½	.12	.11½	.12	.11	.13
Single, 400 lb bbls NY.....lb.	.11½	.12	.11½	.12	.11	.12
Metal ingot.....lb.	.35	.35	.35	.35	.35	.35
Nicotine, free 40%, 8 lb tins, cases.....	8.25	10.15	8.25	10.15	....	....
Sulfate, 55 lb. drums.....lb.	.67	.75	.67	.75	.67	.75
Nitre Cake, bulk.....ton	12.00	14.00	12.00	14.00	10.00	14.00
Nitrobenzene, redistilled, 1000 lb drs wks*.....lb.	.08½	.11	.08½	.11	.08½	.11
Nitrocellulose, c-l-l-cl, wks....lb.	.27	.33	.27	.33	.27	.33
Nitrogenous Material, bulk unit	....	2.75	2.40	3.25	1.50	3.50
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Aleppy, bags.....lb.	....	.18	.....	.18	....	.18
Chinese, bags.....lb.	.17	.18	.17	.18	.17	.18
Oak Bark, ground.....ton	30.00	35.00	30.00	35.00	30.00	35.00
Whole.....ton	20.00	23.00	20.00	23.00	20.00	23.00
Extract, 25% tannin, bbls..lb.	.03¾	.03½	.03¾	.03½	....	....
Orange-Mineral, 1100 lb casks NY.....lb.	....	.10½	.....	.10½	09½	.10½
Orthoaminophenol, 50 lb kgs..lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs....lb.	1.00	1.15	1.00	1.15	1.00	1.15
Orthochlorophenol, drums....lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drums.....lb.	.13	.15	.13	.15	.13	.15
Orthodichlorobenzene, 1000 lb. drums.....lb.	.05½	.06	.05½	.06	05½	.06
Orthonitrochlorobenzene, 1200 lb drs wks.....lb.	.28	.29	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs wk.....lb.	.05½	.06	.05½	.06	.05½	.06
Orthonitrophenol, 350 lb dr...lb.	.52	.80	.52	.80	.52	.90
Orthotoluidine, 350 lb bbl lc-l lb.	.14	.15	.14	.15	.14	.22
Orthonitroparachlorphenol, tins .....lb.	.70	.75	.70	.75	.70	.75
Osage Orange, crystals.....lb.	.16	.17	.16	.17	.16	.17
51 deg. liquid.....lb.	.07	.07¾	.07	.07¾	.06	.07¾
Powdered, 100 lb bags.....lb.	.14½	.15	.14½	.15	.14½	.15
Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P.....lb.	.047	.04¾	.04½	.04¾	.02	.04½
128-132 deg. M. P.....lb.	.04¾	.0515	.04¾	.0515	.03½	.04¾
133-137 deg. M. P.....lb.	.0575	.07	.05¼	.07	.043	.05¾
Para Aldehyde, 110-55 gal drs.lb.*	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb bg..lb.	.52	.60	.52	.60	.52	.60
Aminohydrochloride, 100 lb. kegs.....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kegs...lb.	.78	.80	.78	.80	.78	.80
Chlorophenol, drums.....lb.	.50	.65	50	.65	.50	.65
Coumarone, 330 lb drums..lb.	....	....	.....	.....	....	....
Cymene, refd, 110 gal dr..gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks.....lb.	.16	.20	.16	.20	.15	.18
Nitroacetanilid, 300 lb bbls lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls wks .....lb.	.48	.55	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs wks.....lb.	.23½	.24	.23½	.24	.23½	.26
Nitro-orthotoluidine, 300 lb. bbls.....lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol 185 lb bbls....lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb. bbls.....lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls...lb.	.35	.37	.35	.37	.29	.37
Phenylenediamine, 350 lb bbls .....lb.	1.25	1.30	1.25	1.30	1.15	1.30
Toluenesulfonamide, 175 lb bbls.....lb.	.70	.75	.70	.75	.70	.75
Toluenesulfonchloride, 410 lb bbls wks.....lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls wk..lb.	.56	.60	.56	.60	.56	.60
Paris Green, Arsenic Basis 100 lb kegs.....lb.	....	.23	.....	.23	....	.24
250 lb kegs.....lb.	....	.22	.....	.22	....	.23
Perchlorethylene, 50 gal. dr...lb	....	.15	.....	.15	....	....
Persian Berry Ext., bbls.....lb.	.25	Nom.	.25	Nom	.25	Nom
Pentane, normal, 28-38° C, group 3, tanks.....gal.	....	.09	.....	.09	....	....
Pentasol (see Alcohol, Amyl)...						
Pentasol Acetate (see Amyl Acetate).....						
Petrolatum, Green, 300l b bbl. lb.	.01⅞	.02	.01⅞	.02	.01⅞	.02
Petroleum Ethers, tanks 30-60°, Group 3.....gal.	....	.13	.11	.13	.10	.11
Petroleum solvents and diluents Cleaners' naphtha, Group 3, tanks.....gal.	.06⅞	.07⅞	.06⅞	.07⅞	.05	.07⅞
Lacquer diluents, Bayonne tanks.....gal.	.12	.12½	.12	.12½	.12	.12¾
Group 3, tanks.....gal.	.06⅞	.07⅞	.06⅞	.08⅛	.06¼	.08⅛
Petroleum thinner 47-49 deg. tanks, Group 3.....gal.	.05⅞	.06⅜	.05⅞	.06⅜	....	....
Rubber solvent, stand. grade tanks, Group 3.....gal.	....	.06⅞	.....	06⅞	.05	.06⅞
East Coast tanks.....gal.	....	.09½	.....	.09½	.09	.09½
Stoddard solvents 48-50 deg. tanks, Group 3.....gal.	.06⅜	.06⅜	.06⅜	.07⅛	.04½	.06⅜
East Coast tanks.....gal.	....	.09½	.....	.09½	.09	.09½
Phenol, 250-100 lb drums....lb.	.14½	.15	.14½	.15	.14½	.15
Phenyl-Alpha-Naphthylamine, 100 lb kegs.....lb.	....	1.35	.....	1.35	....	1.35

*Higher price is for lcl quantities.

Phenyl Chloride
Rosin

Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Phenyl Chloride, drums.....lb.	....	.16	.....	.16	....	....
Phenylhydrazine Hydrochloride .....lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phosphate Acid (see Superphosphate)						
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis..ton	2.85	3.20*	2.85	3.20*	2.75	3.25
70% basis.....ton	3.35	3.70*	3.35	3.70*	3.25	3.90
72% basis.....ton	3.85	4.20*	3.85	4.20*	3.75	4.35
75-74% basis.....ton	4.90	5.30*	4.90	5.30*	4.75	5.50
75% basis.....ton	5.05	5.40*	5.05	5.40*	4.85	5.75
77-80% basis.....ton	5.90	6.20*	5.90	6.20*	5.75	6.30
Tennessee, 72% basis.....ton	....	5.00*	.....	5.00*	....	5.00
Phosphorous Oxychloride 175 lb cyl.....lb.	.16	.20	.16	.20	.16	.23
Red, 110 lb cases.....lb.	.44	.45	.44	.45	.40	.45
Yellow, 110 lb cases wks.lb.	.28	.33	.28	.33	.27½	.33
Sesquisulfide, 100 lb cs.....lb.	.38	.44	.38	.44	.38	.44
Trichloride, cylinders.....lb.	.16	.20	.16	.20	.16	.23
Phthalic Anhydride, 100 lb bbls wks.....lb.	.14½	.15	.14½	.15	.13½	.16
Pigments Metallic, Red or brown bags, bbls, Pa. wks.....ton	37.00	45.00	37.00	45.00	37.00	45.00
Pine Oil, 55 gal drums or bbls						
Destructive dist.....lb.	.59	.62	.59	.62	.59	.62
Steam dist. wat. wh. bbls..gal.	.64	.65	.64	.65	....	....
Prime bbls.....bbl.	8.00	10.60	8.00	10.60	8.00	10.60
Pitch Hardwood wks.....ton	....	20.00	.....	20.00	20.00	25.00
Plaster Paris, tech, 250 lb bbls .....bbl.	3.40	3.50	3.40	3.50	3.30	3.50
Platinum, Refined.....os.	37.00	38.00	37.00	38.00	24.00	38.00
Pontol, tanks .....per gal.	....	.54	.....	.54	....	.54
Potash, Caustic, wks, solid...lb.	.07½	.07⅝	.07⅛	07¾	.06½	.07¾
flake.....lb.	.0803	.08½	.0803	.08½	.0705	.08½
Liquid, tanks .....lb.	....	.03¾	.....	.03¾	....	....
Potash Salts, Rough Kainit						
12.4% basis bulk.....ton	....	9.20	.....	9.20	....	9.20
14% basis.....ton	....	9.70	.....	9.70	....	9.70
Manure Salts.....						
20% basis bulk.....ton	....	12.00	.....	12.00	....	12.00
30% basis bulk.....ton	....	19.15	.....	19.15	....	19.15
Potassium Acetate.....lb.	.27	.28	.27	.28	.27	.28
Potassium Muriate, 80% basis bags.....ton	....	37.15	.....	37.15	....	37.15
Pot. & Mag. Sulfate, 48% basis bags.....ton	....	25.00	.....	25.00	25.00	27.80
Potassium Sulfate, 90% basis bags.....ton.	....	42.15	....	42.15	42.15	47.50
Potassium Bicarbonate, USP, 320 lb bbls.....lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb casks.....lb.	.08½	.08¾	.08½	.08¾	.07¼	.08¾
Binoxalate, 300 lb bbls.....lb.	.22	.23	.14	.23	.14	.17
Bisulfate, 100 lb kegs.....lb.	.16	.30	.16	.30	.16	.30
Carbonate, 80-85% calc. 800 lb casks.....lb.	.07	.07½	.07	.07½	.04¾	.07½
Chlorate crystals, powder 112 lb keg wks.....lb.	....	.09	.08½	.09	.08	.09
Chloride, crys bbls.....lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kegs.....lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb. cases.....lb.	.55	.60	.55	.60	.50	.60
Iodide, 75 lb. bbls.....lb.	1.75	1.90	1.75	2.70	2.35	2.70
Metabisulfite, 300 lb. bbl...lb.	.10½	.11	.10½	.11	.10½	.11
Oxalate, bbls.....lb.	.16	.24	.16	.24	.16	.24
Perchlorate, casks wks.....lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys 500 & 100 lb drs wks.....lb.	.18½	.19½	.18½	.19½	.17½	.19½
Prussiate, red, 112 lb keg...lb.	.39	.41	.35	.39	.39	.41
Yellow, 500 lb casks.....lb.	.18	.19	.18	.19	.16½	.19
Tartrate Neut, 100 lb keg...lb.	....	.21	.....	.21	....	.21
Titanium Oxalate, 200 lb bbls .....lb.	.32	.35	.32	.35	....	....
Propane, group 3, tanks.....	....	.07	.....	.07	....	.07
Pumice Stone, lump bags.....lb.	.04½	.06	.04½	.06	.04	.06
250 lb bbls.....lb.	.05	.07	.05	.07	.04½	.07
Powdered, 350 lb bags.....lb.	.02½	.03	.02½	.03	.02½	.03
Putty, commercial, tubs..100 lb.	....	2.25	.....	2.25	2.00	2.25
Linseed Oil, kegs.....100 lb.	4.00	4.50	4.00	4.50	3.40	4.50
Pyridine, 50 gal drums .....gal.	....	1.25	.....	1.25	.85	1.25
Pyrites, Spanish cif Atlantic ports bulk.....unit	.12	.13	.12	.13	.12	.13
Quebracho, 35% liquid tks...lb.	....	.02½	.02½	.02¾	.02	.02¾
450 lb bbls c-l .....lb.	.02¾	.02¾	.02¾	.02¾	.02¾	.02¾
Solid, 63%, 100 lb bales cif..lb.	....	.02¾	.02¾	.03¾	.02¾	.03¾
Clarified, 64%, bales... lb.	....	.03	.03	.03½	.02¾	.03½
Quercitron, 51 deg liquid 450 lb bbls .....lb.	.06	.06½	.05½	.06½	.05½	.06
Solid, 100 lb boxes.....lb.	.10	.12	.09½	.13	.09½	.13
Bark, Rough.....ton	....	14.00	.....	14.00	....	14.00
Ground.....ton	34.00	35.00	34.00	35.00	34.00	35.00
R Salt, 250 lb bbls wks.....lb.	.40	.44	.40	.44	.40	.44
Red Sanders Wood, grd bbls. lb.	....	.18	.....	.18	....	.18
Resorcinol Tech, cans.....lb.	.65	.75	.65	.75	.65	.70
Rochelle Salt, cryst.....lb.	.15½	.16	.12½	.16	....	....
Rosin Oil, 50 gal bbls, first run .....gal.	....	.48	.45	.48	.42	.46
Second run.....gal.	....	.53	.50	.53	.46	.51
FF Wood Rosin, c. l. N. Y.....	....	5.80	5.05	6.13	....	....
Rosins 600 lb bbls 280 lb.....unit ex. yard N. Y.						
B.....	....	5.70	4.50	5.75	2.75	5.15
D.....	....	5.85	4.60	5.85	2.95	5.15
E.....	....	6.00	4.80	6.50	3.55	5.15
F.....	....	6.10	5.00	6.75	3.85	5.17½
G.....	....	6.15	5.05	6.75	3.90	5.17½
H.....	....	6.20	5.10	6.75	4.00	5.17½
I.....	....	6.25	5.15	6.75	4.05	5.20
K.....	....	6.40	5.30	6.75	4.60	5.20
M.....	....	6.50	5.50	6.80	4.35	5.25
N.....	....	6.50	5.50	6.80	4.75	5.40

*Higher prices run to Jan.-June 1935.

Current

Rosin
Starch, Potato

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Rosin, WG	6.55	5.95	6.80	4.80	5.60
WW	6.60	.....	6.85	4.85	6.20
Rotten Stone, bags mines....ton	23.50 24.00	23.50	24.00	23.50	24.00
Lump, imported, bbls.....lb.	.05 .07	.05	.07	.05	.07
Selected bbls.....lb.	.09 .12	.09	.12	.09	.12
Powdered, bbls.....lb.	.02½ .05	.02½	.05	.02	.05
Sago Flour, 150 lb bags.....lb.	.02½ .03	.02½	.03	.02½	.03
Sal Soda, bbls wks.....100 lb.	1.10 1.10	1.10	1.10	.90	1.10
Salt Cake, 94-96% c-l wks...ton	13.00 18.00	13.00	18.00	13.00	18.00
Chrome.....ton	12.00 13.00	12.00	13.00	12.00	13.00
Saltpetre, double refd granular 450-500 lb bbls.....lb.	.06	.....	.06	.05¾	.06¼
Satin, White, 500 lb bbls.....lb.	.01½	.....	.01½	....	.01½
Shellac Bone dry bbls.....lb.	.26 .28	.26	.31	.18	.28
Garnet, bags.....lb.	.24 .25	.24	.25	.15	.20
Superfine, bags.....lb.	.23 .24	.23	.24	.09½	.18¾
T. N. bags.....lb.	.21 .21¾	.20	.21¾	.08½	.17¾
Schaeffer's Salt kegs.....lb.	.48 .50	.48	.50	.48	.50
Silica, Crude, bulk mines....ton	8.00 11.00	8.00	11.00	8.00	11.00
Refined, floated bags.....ton	22.00 30.00	22.00	30.00	22.00	30.00
Air floated bags.....ton	32.00	.....	32.00	....	32.00
Extra floated bags.....ton	30.00 35.00	30.00	35.00	30.00	35.00
Silver Nitrate, vials.....oz.	.31⅞	.31⅞	.35¾	....	....
Soapstone, Powdered, bags f.o.b. mines.....ton	15.00 22.00	15.00	22.00	15.00	22.00
Soda Ash, 58% dense, bags c-l wks.....100 lb.	1.25	.....	1.25	1.17½	1.25
58% light, bags.....100 lb.	1.23	.....	1.23	1.15	1.23
Soda Caustic, 76% grnd & flake drums.....100 lb.	3.00	.....	3.00	2.90	3.00
76% solid drs.....100 lb.	2.60	.....	2.60	2.50	2.60
Liquid sellers tanks, 100 bls.	2.25	.....	2.25	2.15	2.25
Sodium Abietate, drs.....lb.	.06	.03	.06	....	.03
Acetate, tech 450 lb. bbls wks lb.	.04¾ .05	.04¾	.05	.04½	.05
Alignate, drs.....lb.	.50	.....	.50	....	.50
Arsenate, drums.....lb.	.07¾ .08¼	.07¾	.08¼	.07¾	.08¼
Arsenite, drums.....gal.	.50 .75	.50	.75	.05	.75
Benzoate U.S.P., kegs.....lb.	.45 .47	.45	.47	....	....
Bicarb, 400 lb bbl.....100 lb.	2.25	.....	2.25	....	2.25
Bichromate, 500 lb cks wks lb.	.06½ .06¾	.06½	.06¾	.044	.07
Bisulfite, 500 lb bbl wks....lb.	.03 .0335	.03	.0335	.02¾	.0335
Chlorate, wks.....lb.	.06½ .07¼	.06¼	.07¼	.05¾	.07¼
Chloride, technical.....ton	13.60 16.50	11.40	16.50	11.40	14.00
Cyanide, 96-98%, 100 & 250 lb drums wks.....lb.	.16½	.....	.16½	.15½	.16
Fluoride, 300 lb bbls wks....lb.	.07½ .09½	.07½	.09½	.07	.07½
Hydrosulfite, 200 lb bbls f.o.b. wks.....lb.	.19½ .21	.19½	.21	.20	.21
Hypochloride solution, 100 lb. cbys.....lb.	.05	.....	.05	....	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks.....100 lb.	2.40 3.00	2.40	3.00	2.40	3.00
Technical, regular crystals 375 lb bbls wks....100 lb.	2.40 2.65	2.40	2.65	2.40	2.65
Iodide.....lb.	3.50	.....	3.50	3.10	3.50
Metanilate, 150 lb bbls....lb.	.41 .42	.41	.42	.44	.45
Metasilicate, c-l, wks..100 lb.	2.65 3.05	2.65	3.05	2.65	3.25
Monohydrate, bbls.....lb.	.02½	.....	.02½	....	.02½
Naphthionate, 300 lb bbl...lb.	.52 .54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb. bags c-l NY .....100 lb.	1.31½	.....	1.31½	1.26	1.31½
100 lb. bags lb.....ton	27.00	.....	27.00	....	....
Bulk.....ton	24.50	.....	24.50	....	....
Nitrite, 500 lb bbls spot....lb.	.07½ .08	.07¼	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls wks.....lb.	.25 .27	.25	.27	.25	.27
Perborate, 275 lb bbls.....lb.	.18 .19	.18	.19	.17	.19
Peroxide, bbls. 400 lb.....lb.	.17	.....	.17	....	....
Phosphate, di-sodium, tech. 310 lb bbls.....100 lb.	2.20 2.40	2.20	2.40	2.00	2.40
tri-sodium, tech, 325 lb bbls.....100 lb.	2.60	.....	2.60	2.15	2.50
Picramate, 160 lb kegs ....lb.	.69 .72	.69	.72	.69	.72
Prussiate, Yellow, 350 lb bbl wks.....lb.	.11½ .12	.11½	.12	.11½	.12
Pyrophosphate, 100 lb keg..lb.	.16½ .18	.16½	.18	.15	.20
Silicate, 60 deg 55 gal drs, wks .....100 lb.	1.65 1.70	1.65	1.70	1.65	1.70
40 deg 55 gal drs, wks .....100 lb.	.80*	.....	.80*	.75	.80
Silicofluoride, 450 lb bbls NY .....lb.	.04¾ .05	.04¾	.06	.04½	.06
Stannate, 100 lb drums.....lb.	.35½ .37	.34	.37	.18	.37
Stearate, bbls.....lb.	.20 .25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls.....lb.	.16 .18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-l wks.....lb.	.022 .0285	.022	.0285	.02	.0285
Sulfide, 80% crystals, 440 lb bbls wks.....lb.	.02½	.02¼	.02½	.02½	.02¾
62% solid, 650 lb drums c. l. wks.....lb.	.03	.....	.03	....	.03
Sulfite, crystals, 400 lb bbls wks.....lb.	.02½ .02¾	.02½	.02¾	.03	.03¼
Sulfocyanide, bbls .....lb.	.28 .35	.28	.35	.28	.35
Tungstate, tech, crystals, kegs .....lb.	.83 .88	.70	.88	.57	.67
Spermaceti, blocks, cases.....lb.	.19 .20	.18	.20	.17	.22
Cakes, cases.....lb.	.20 .21	.19	.21	.18	.23
Spruce Extract, ord., tanks..lb.	.01	.....	.01	.00⅞	.01
Ordinary, bbls.....lb.	.01½	.....	.01½	.01½	.01½
Super spruce ext., tanks...lb.	.01½	.....	.01½	.01½	.01½
Super spruce ext., bbls....lb.	.01½	.....	.01½	.01½	.01½
Super spruce ext. powd., bags .....lb.	.04	.....	.04	....	.04
Starch, powd, 140 lb bags .....100 lb.	2.81 3.01	2.81	3.01	2.29	3.01
Pearl, 140 lb bags.....100 lb.	2.71 2.91	2.71	2.91	2.19	2.91
Potato, 200 lb bags.....lb.	.05½ .06	.05½	.06	.03¾	.06
Imported bags.....lb.	.06 .06½	.06	.06½	.04¼	.06½

*Tanks, 15c less.

Starch, Potato
Zinc Dithiofuroate

Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Starch, Potato Soluble ....lb.	.08	.08½	.08	.08½	.08	.08½
Rice, 200 lb bbls....lb.	.07½	.08½	.07½	.08½	.07	.08½
Wheat, thick bags....lb.	.06¼	.06¾	.06¼	.06¾	.05¾	.06¾
Thin bags....lb.	.10	.10¼	.10	.10½	.09½	.10½
Strontium carbonate, 600 lb bbls wks....lb.	.07½	.07½	.07½	.07½	.07½	.07½
Nitrate, 600 lb bbls NY....lb.	.10½	.11	.10½	.11	.07	.11
Peroxide, 100 lb drs....lb.	....	1.25	.....	1.25	....	1.25
Sulfur Brimstone, broken rock, 250 lb bag c-l....100 lb.	....	2.05	.....	2.05	....	2.05
Crude, f. o. b. mines....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour for dusting 99½%, 100 lb bags c-l NY....100 lb.	....	2.40	.....	2.40	....	2.40
Heavy bags c-l....100 lb.	....	2.50	.....	2.50	....	2.50
Flowers, 100%, 155 lb bbls c-l NY....100 lb.	....	3.45	.....	3.45	....	3.45
Roll, bbls lc-l NY....100 lb.	2.65	2.85	2.65	2.85	2.65	2.85
Sulfur Chloride, red, 700 lb drs wks....lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs wks....lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl....lb.	.07	.08	.07	.08	.07	.08
Extra, dry, 100 lb cyl....lb.	.11	.13	.11	.13	.10	.13
Sulfuryl Chloride....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, ground....ton	70.00	73.00	69.00	75.00	50.00	75.00
Talc, Crude, 100 lb bgs NY..ton	12.00	15.00	12.00	15.00	12.00	15.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bags NY....ton	27.50	30.00	27.50	30.00	18.00	30.00
Refined, white, bags....ton	45.00	60.00	45.00	60.00	35.00	60.00
Italian, 220 lb bags to arr..ton	70.00	75.00	70.00	75.00	48.50	75.00
Refined, white bags N.Y.ton	75.00	80.00	75.00	80.00	50.00	80.00
Superphosphate, 16% bulk, wks....ton	....	8.00	.....	8.00	6.50	8.00
Run of pile....ton	....	7.50	.....	7.50	6.00	7.50
Tankage Ground NY....unit	....	2.65*	2.50	2.75*	1.70	2.75*
Unground....unit	....	2.50	.....	2.35	2.35	2.60
Fert. grade f.o.b. Chicago.unit	....	1.90*	1.90	2.40*	1.40	3.00
South American cif....unit	....	2.90*	2.90	3.10*	....	2.50
Tapioca Flour, high grade bgs.lb	.03	.05	.03	.05	.03	.05
Medium grade, bags....lb.	.03	.04	.03	.04	.03	.04
Tar Acid Oil, 15%, drums...gal.	.21	.22	.21	.22	.20	.22
25% drums....gal.	.23	.24	.23	.24	.22	.24
Tartar Emetic, Tech....gal.	....	.22¾	.23	.23	....	....
U. S. P....gal.	.28	.28½	.27	.28½	....	....
Terra Alba Amer. No. 1, bgs or bbls mills....100 lb.	1.15	1.75	1.15	1.75	1.15	1.75
No. 2 bags or bbls...100 lb.	1.00	1.25	1.00	1.25	1.00	1.25
Imported bags....lb.	.01½	.01¼	.01½	.01¼	.01½	.01¼
Tetrachlorethane, 50 gal dr...lb.	.08½	.09	.08½	.09	.08½	.09
Tetralene, 50 gal drs wks....lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl....lb.	.20	.25	.20	.25	.25	.28½
Tin....						
Crystals, 500 lb bbls wks...lb.	....	.40	.30	.40½	.24	.41
Metal Straits NY....lb.	....	.549	.50⅝	.55⅜	.23	.57
Oxide, 300 lb bbls wks....lb.	.58	.60	.55	.60	.27½	.59
Tetrachloride, 100 lb drs wks....lb.	.27	.28	.25½	.28½	.126	.28
Titanium Dioxide 300 lb bbl...lb.	.17½	.19¼	.17½	.19¼	.17½	.19¼
Calcium Pigment, bbls....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Toluene, 110 gal drs....gal.	....	.35	.....	.35	....	.35
8000 gal tank cars wks....gal.	....	.30	.....	.30	....	.30
Toluidine, 350 lb bbls....lb.	.88	.89	.88	.89	.88	.89
Mixed, 900 lb drs wks....lb.	.27	.28	.27	.28	.27	.28
Toner Lithol, red, bbls....lb.	.80	.85	.80	.85	.80	.95
Para, red, bbls....lb.	....	.80	.....	.80	....	.80
Toluidine....lb.	....	1.35	.....	1.35	1.35	1.55
Triacetin, 50 gal drs wks....lb.	.32	.36	.32	.36	.32	.36
Trichlorethylene, 50 gal dr...lb.	.09½	.10	.09½	.10	.09½	.10
Triethanolamine, 50 gal drs...lb	.35	.38	.35	.38	.35	.38
Tricresyl Phosphate, drs....lb.	.19	.26	.19	.26	.19	.26
Triphenyl guanidine....lb.	.58	.60	.58	.60	.58	.60
Phosphate, drums....lb.	.37	.39	.37	.39	.37	.39
Tripoli, 500 lb bbls....100 lb.	.75	2.00	.75	2.00	.75	2.00
Tungsten, Wolframite..per unit	12.00	12.50	12.00	12.50	10.00	12.50
Turpentine carlots, N. Y. dock bbls....gal.	.56¼	.56½	.47¾	.63½	.46½	.51½
Savannah, bbls....gal.	....	.51¼	.42¾	.58½	....	....
Jacksonville, bbls....gal.	.51½	.52	.43	.58½	....	....
Wood Steam dist, bbls, c. l. N. Y....gal.	....	.53	.44	.61	.42	.48
Urea, pure, 112 lb cases....lb.	.15	.17	.15	.17	.15	.17
Fert. grade, bags c.i.f....ton	100.00	120.00	90.00	120.00	82.60	90.00
c. i. f. S. points....ton	100.00	120.00	90.00	120.00	82.60	90.00
Urea Ammonia liq. 55% NH_3, tanks....unit	....	.96	.....	.96	....	....
Valonia Beard, 42%, tannin bags....ton	....	40.00	39.00	40.00	27.50	42.00
Cups, 30-31% tannin....ton	26.00	27.00	23.00	27.00	17.00	25.00
Mixture, bark, bags....ton	....	28.00	.....	28.00	22.00	28.00
Vermillion, English, kegs....lb.	1.60	1.73	1.41	1.73	1.05	1.42
Vinyl Chloride, 16 lb cyl....lb.	....	1.00	.....	1.00	....	1.00
Wattle Bark, bags....ton	....	31.00	30.00	34.00	24.00	32.00
Extract 55%, tanks, bbls...lb.	....	.03⅜	.03⅜	.03⅜	.03	.03⅜
Whiting, 200 lb bags, c-l wks....100 lb.	.85	1.00	.85	1.00	.85	1.00
Alba, bags c-l NY....ton	....	15.00	.....	15.00	13.00	15.00
Gilders, bags c-l NY...100 lb.	....	1.35	.....	1.35	....	1.35
Wood Flour, c-l....bags	18.00†	30.00	18.00†	30.00	18.00	36.00
Xylene, 10 deg tanks wks...gal.	....	.29	.....	.29	.29	.29
Commercial, tanks wks...gal.	....	.26	.....	.26	....	.26
Xylidine, crude....lb.	.36	.37	.36	.37	.36	.37
Zinc Ammonium Chloride powd., 400 lb bbls....lb.	.04¾	.05	.04¾	.05	.04¾	.05
Carbonate Tech. bbls NY..lb.	.09½	.11	.09½	.11	.09½	.11
Chloride Fused, 600 lb drs wks....lb.	.04¼	.05	.04¼	.05	.05	.05¼
Gran, 500 lb bbls wks....lb.	....	.05½	.05⅝	.06	.05⅜	.06
Soln 50%, tanks wks...100 lb.	....	2.00	.....	2.00	....	3.00
Cyanide, 100 lb drums....lb.	.36	.41	.36	.41	.38	.39
Dithiofuroate, 100 lb dr....lb.	....	1.00	.....	1.00	....	1.00

*&10 †Depends upon grade

Current

Zinc Dust
Whale Oil

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Zinc Dust, 500 lb bbls c-l wks ....lb.	....	.0635	0635	.071	.04¾ .07½
Metal, high grade slabs c-l NY.....100 lb.	....	4.77	4.65	4.87	3.02 5.37
Oxide, American bags wk...lb.	.05½	.06½	.05¾	.06½	.05 .06
French, 300 lb bbls wks...lb.	.05¾	.11½	.05¾	.11½	.05¾ .11½
Palmitate, bbls.....lb.	.20	.21	.20	.21	.17½ .21
Perborate, 100 lb drs.....lb.	....	1.25	.....	1.25	.... 1.25
Peroxide, 100 lb drs.....lb.	....	1.25	.....	1.25	.... 1.25
Resinate, fused, dark, bbls. lb.	.05¾	.06½	.05¾	.06½	.05¾ .06½
Stearate, 50 lb bbls.....lb.	.18	.19	.18	.19	.15 .19
Sulfate, crystals, 400 bbl wks lb.	.028	.033	.02½	.033	.03 .03½
Flake, bbls.....lb.	.032	.037	.....	....	....
Sulfide, 500 lb bbls.....lb.	.13	.13½	.13	.13½	.12 .13½
Sulfocarbolate, 100 lb keg..lb.	.21	.22	.21	.22	.21 .22
Zirconium Oxide, Nat. kegs...lb.	.02½	.03	.02½	.03	.02½ .03
Pure kegs.....lb.	.45	.50	.45	.50	.45 .50
Semi-refined kegs.....lb.	.08	.10	.08	.10	.08 .10

Oils and Fats

Castor, No. 1, 400 lb bbls....lb.	....	.09¼	.....	.09¾	.09¼	.10
No. 3, 400 lb bbls.....lb.	....	.09½	.....	.09¾	.08½	.09¾
Blown, 400 lb bbls.....lb.	.12¼	.12¾	.12¼	.12¾	.11¼	.12¾
China Wood, bbls spot NY...lb.	.08¼	.08½	.07½	.08½	.04¼	.09¼
Tanks, spot NY.....lb.	.08	.08½	.07¼	.08¼	.04¼	.08½
Coast, tanks.....lb.	.07¼	.07½	.06¾	.07½	.04⅛	.08⅛
Coconut, edible, bbls NY....lb.	....	.10½	.....	.10½	....	.10½
Ceylon, 375 lb bbls NY....lb.	.03⅝	.03⅞	.03⅞	.03¾	.03⅞	.04¼
8000 gal tanks NY.....lb.	.02⅝	.02¾	.02⅝	.02¾	.02½	.03⅜
Cochin, 375 lb bbls NY....lb.	.04¼	.04½	.04¼	.04⅝	.04½	.05¼
TanksN Y.....lb.	.04	Nom.	.04	Nom.	.04	.05
Manila, bbls NY.....lb.	.03⅝	.03¾	.03⅝	.04	.03⅞	.04¾
Tanks NY.....lb.	....	.02¼	.02⅝	.03	.02¾	.03¾
Tanks, Pacific Coast.....lb.	.02¾	.02½	.02¼	.02⅞	.02½	.03⅛
Cod, Newfoundland, 50 gal bbls .....gal.	.48	Nom.	34	.40	.19	.35
Copra, bags, N. Y.....lb.	.012	.0125	.012	.016	.0152½	.019
Corn, crude, bbls NY.....lb.	.05⅞	.06	.04⅝	.06	.04⅛	.07¾
Tanks, mills.....lb.	.04⅝	.04¾	.03½	.04⅞	.02⅞	.06½
Refined, 375 lb bbls NY...lb.	.06⅝	.07¼	.05¾	.07¼	.05¾	.08¼
Cottonseed, crude, mill South-east & Valley.....lb.		*(See Oils and Fats News Section)*				
Texas.....lb.		*(See Oils and Fats News Section)*				
Degras, American, 50 gal bbls NY.....lb.	.02¾	.03	.02¾	.03	.02½	.03
English, brown, bbls NY..lb.	.04¼	.04½	.03¾	.04	.02¾	.04
Greases, Brown.....lb.	.02½	.03	.02	.03	.02	.03½
Yellow.....lb.	.03½	.03¼	.02⅜	.03¼	.01¾	.03⅜
White, choice bbls NY.....lb.	.03½	.03⅝	.02¾	.03⅝	.02½	.04⅜
Herring, Coast, Tanks.....gal.	.15	Nom.	.15	15	.11	.23
Lard Oil, edible, prime.....lb.	....	.09¾	.....	.09¾	.08½	.10½
Extra, bbls.....lb.	....	.07¾	.....	.07¾	.07½	.08¼
Extra No. 1, bbls.....lb.	....	.07½	.....	.07½	.06	.08
Linseed, Raw, lessthan5bbl.lotslb.	....	.101	.101	.105	.08	.12
Bbls c-l spot.....lb.	....	.097	.093	.097	.072	.11
Tanks.....lb.	....	.091	.087	.091	.066	.104
Menhaden Tanks, Baltimore.gal.	.16	.20	.15	.17	.09	.15
Refined, alkali bbl.....lb.	.063	.069	.063	.069	....	....
Tanks.....lb.	....	.059	.059	.061	....	....
Light Pressed, bbls.....lb.	.051	.057	.051	.057	....	....
Tanks.....lb.	....	.047	.047	.049	....	....
Neatsfoot, CT, 20° bbls NY...lb.	....	.16½	.....	.16½	.11¾	.16¾
Extra, bbls NY.....lb.	....	.07¾	.....	.07¾	.06½	.08¼
Pure, bbls NY.....lb.	....	.12	.12	.13	.07¾	.14
Oleo, No. 1, bbls NY.....lb.	....	.06½	.06½	.06½	.05	.06⅞
No. 2, bbls NY.....lb.	....	.05⅜	.05⅜	.05⅞	.04½	.06⅜
Olive, denatured, bbls NY...gal.	.89	.90	.76	.90	.47	.80
Edible, bbls NY.....gal.	1.75	1.90	1.60	1.90	1.30	1.85
Foots, bbls NY.....lb.	.07	.07⅛	.06½	.07⅛	.04⅜	.06¾
Palm, Kernel Casks.....lb.	.03½	Nom.	.03½	.04½	.04	.04¾
Lagos, 1500 lb casks.....lb.	....	.03⅞	.03⅜	.03⅞	.02⅜	.04¾
Niger, Casks.....lb.	.03½	.03⅝	.03⅜	.03⅝	.024	.04½
Peanut, crude, bbls NY.....lb.	....	.07⅜	.06½	.07⅜	.03½	.07
Refined, bbls NY.....lb.	.08½	.10	.07½	.10½	.07½	.11
Perilla, bbls NY.....lb.	.08½	.09	.08½	.09⅛	.05	.10½
Tanks, Coast.....lb.	.07¼	Nom.	07¼	.08	.03¾	.09¾
Poppyseed, bbls NY.....gal.	1.50	1.60	1.45	1.60	1.45	1.70
Rapeseed, blown, bbls NY...gal.	.08	.082	.08	082	....	....
denatured, drms, NY.....gal.	.39	.40	.39	.44	.34	.65
Red, Distilled, bbls.....lb.	.06¼	.07⅜	.06¼	.07⅜	.05¼	.07⅜
Tanks.....lb.	....	.06	.....	.06	.05	.06
Salmon, Coast, 8000 gal tks. gal.	....	Nom.	.15	.17	.11	.18
Sardine, Pacific Coast tks...gal.	....	.22½	.13	.20	.09½	.20
Sesame, edible, yellow, dom..lb.	.07½	.08	.07½	.09	.08½	.10
White, dos.....lb.	.08	.08½	.08	.09½	.10	.11
Sod, bbls NY.....gal.	....	.40	.....	.40	....	.40
Soy Bean, crude.....						
Pacific Coast.....lb.	....	Nom.	.....	Nom.	.032	.035
Domestic tanks, f.o.b. mills, lb.	....	.06½	.06	.06½	.027	.085
Crude, bbls NY.....lb.	.071	.075	.066	.071	.04	.095
Refined, bbls NY.....lb.	.076	.087	.071	.087	.04½	.106
Sperm, 38° CT, bleached, bbls NY.....lb.	.108	.11	.108	.11	....	....
45° CT, bleached, bbls NY..lb.	.101	.103	.101	.103	....	....
Stearic Acid, double pressed dist bags.....lb.	.09	.10	.09	.10	.07½	.10
Double pressed saponified bags .....lb.	.09	.10	.09	.10	.08	.10
Triple, pressed dist bags..lb.	.11½	.12¾	.11½	.12¾	.10½	.12¾
Stearine, Oleo, bbls.....lb.	.05¾	.05¾	.05	.05¾	.03½	.06¾
Tallow City, extra loose.....lb.	....	.03½	.02¾	.03½	.02	.03¾
Edible, tierces.....lb.	....	....	.04¾	.04¾	.03½	.05¼
Tallow Oil, Bbls, c-l NY...lb.	.05¾	.06	.05¾	.06	.05¾	.06
Acidless, tanks NY.....lb.	....	.06¾	.....	.06¾	.05	.07¼
Vegetable, Coast mats.....lb.	.06	Nom.	.06	Nom.	.04½	.06
Turkey Red, single, bbls.....lb.	.07½	....	.07½	....	.06¼	.07½
Double, bbls.....lb.	.12½	.13	.12½	13	.08	.13
Whale,.....						
Winter bleached, bbls, NY..lb.	....	.072	.....	.072	....	....
Refined natural, bbls, NY..lb.	.068	.07	.068	.07	....	....

THE CHEMICAL MARKET-PLACE

Local Suppliers

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Index to Advertisers

"We"—Editorially Speaking

We have long known that "Capt'n Charlie" was the patron saint of southern chemical industries, and we note with warm satisfaction that he appears in print (*Rayon and Mel iand Textile Monthly*) as Dr. Charles St. Herty. Too bad nobody invited us to the canonization services.

We have not as yet added quotations on "heavy water" to our "Current Prices" section despite the fact that Imperial Chemical Industries is said to be ready to deliver it at $50 a teaspoonful—not more than one teaspoonful a day.

Our first "contact" with the newly appointed Chemical Code Authority was a demand on his part to censor our editorial comments on a piece of regular and legitimate industrial news being released to the trade press. Well—oh, you know what the little girl said about the broccoli.

W. L. Churchill, has been engaged in industrial consulting and managerial practice since 1908, and has specialized since 1920 in putting business enterprises on a profit producing basis by application of a number of economic principles, which he discusses in our article on "Right Prices" He is the author of a book, "Pricing for Profit."

"Best starch in the world can be made from sweet potatoes" says the T.V.A.—Iowa papers please copy.

The self same day General Johnson announces the U. S. Department of Justice will prosecute price chiselers under the code, Chairman Morgan, of the T.V.A., complains "prices (of cement) submitted by the various manufacturers indicate collusion as all quotations were the same." Which might be referred to the Eat-and-have-your-cake Bureau, or the One-man's meat-another's-poison Committee, but which will doubtless stay in the good old Raised Eyebrows Department.

Comment from one of our most valued Consulting Editors: "I note on page 333 of the April, 1934, issue of "CHEMICAL INDUSTRIES," item QC112—A new aluminum wheelbarrow . . . . is non-toxic. I would like to have your definition of a toxic wheelbarrow."

A Chemical Tourist Through the South

The next instalment in this chemical travelogue will be published in the June issue and will cover all of the sulfur operations from the new plant in the Delta on the Mississippi to the Benevides mines of the Duval Sulfur Company, and also the two new alkali plants at Corpus Christi, Texas, and Lake Charles, La.

After all Congress might remember that it has never yet passed a law requiring any one at any time to buck the Stock Market.

Long Islanders and calcium chloride producers will welcome news that that railroad will add five chloride cars for next year's snow removal.

Recent issue of *Ceramic Industry* shows photograph of a radio built into a cooking stove. With Dad banging into trees while too absorbed with his car-radio and Ma burning the dinner, listening to "Rudy" Vallee's crooning, from the spot where the potatoes should be boiling, the average American family must certainly have a deep-seated appreciation of some kind of music—be it good, bad or indifferent.

Fifteen Years Ago

From our issues of May, 1919

Chemical Alliance recommends $15,000,000 chemical export corporation to simplify the problem of finding foreign markets for American products.

Annual dye exports valued at $10,000,000.

Wall Street proposes combination into one corporation of The Barrett Company, General Chemical, Semet-Solvay, and National Aniline; action debated as probable result of foreign competition.

Heyden Chemical Company, incorporated for $2,500,000, active capital, appears on the curb.

Supplies of shellac scarce and higher.

International Chemical Alliance replacing old International Chemical Society, formed by Allies in Paris, as a means of combating German competition.

A new use has been found for chemical patents. British economic experts consider them the surest sign of returning prosperity. Dr. E. E. Free, of the *Week's Science*, on the other hand, suspects that the increase in recent chemical patent applications is due to the fact that the larger companies during hard times take chemists off of operations and put them on to research. We suggest the whole matter be referred to the Breyer Committee.

One of the first pandemic chemistry courses in the country, given for the first time in 1926, was developed by John A. Timm, who wrote the first pandemic text, "An Introduction to Chemistry." Born in '98, a Yale graduate with Ph. B. and Ph. D., and instructor and assistant professor at that University. His research work embraces cellulose, cyclic acetals, barbituric acid hypnotics, dissociation constants of organic bases.

Report of Progress under the NRA:—six months ago Gen. Johnson accused opponents of "hurling brickbats and dead cats," at Columbus. May 4, he admitted "they know what they want and they do not scatter their shot."

Soviet influence is detected in recent *N. Y. World-Telegram* (Scripps-Howard) headline "Columbia's Sherman Nicholas Medal Winner." Which sadly recalls to our mind the time we used cut of William H. Nichols, Jr., in connection with a news item on the Nichols Medal in such manner as to lead the reader to suspect that Mr. Nichols, Jr., was the recipient.

The publicity thrust upon the international armament manufacturers recently must have had some effect on the news editor of the British Society of Chemical Industry for in their journal of February 16th, will be found the following remarkable statement: "It is officially announced that the Imperial Chemical Industries is uniting its interests in Argentina with those of Du Pont de Nemours & Company, the American steel and armaments firm."

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CHEMICAL INDUSTRIES

FORMERLY KNOWN AS "CHEMICAL MARKETS"

VOLUME XXXIV JUNE, 1934 NUMBER 6

Contents for June, 1934

Regular Departments

CHEMICAL INDUSTRIES *is indexed regularly in the* INDUSTRIAL ARTS INDEX

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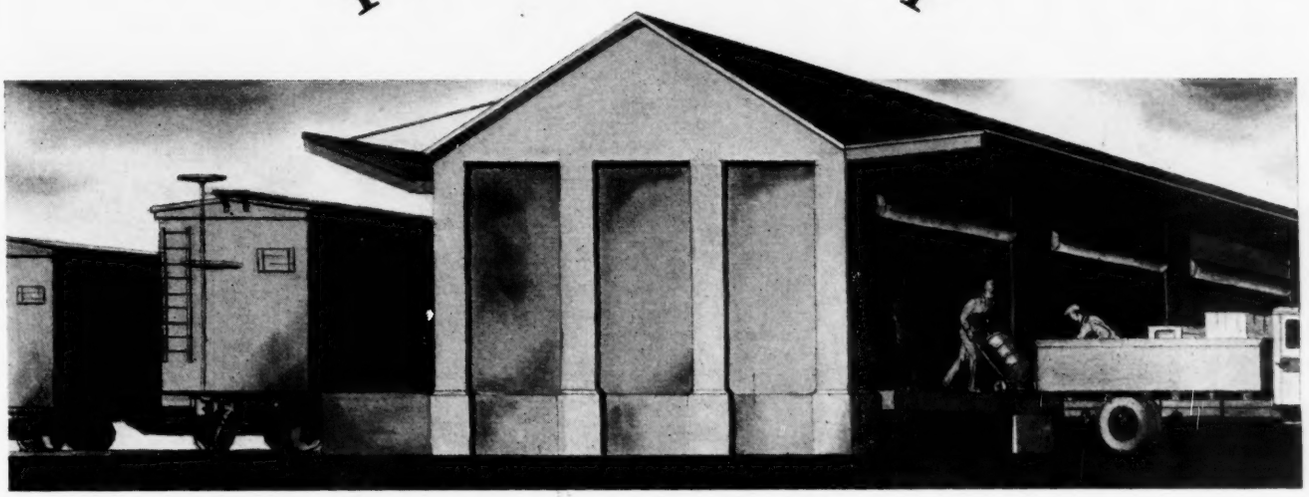
YOUR PLANT



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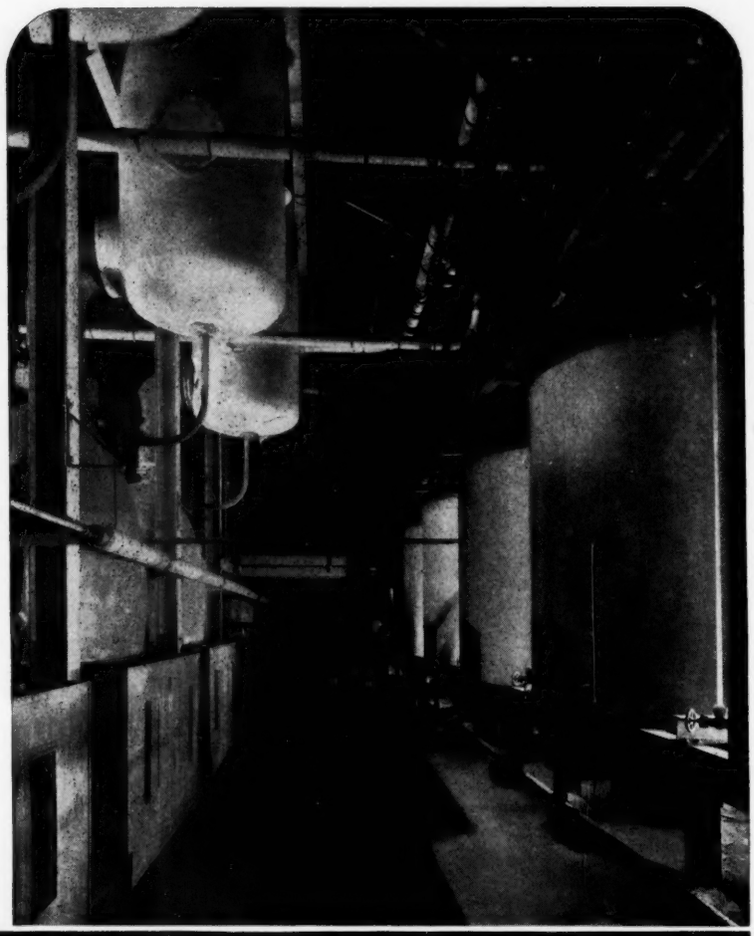

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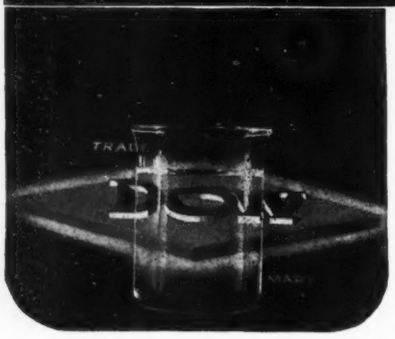

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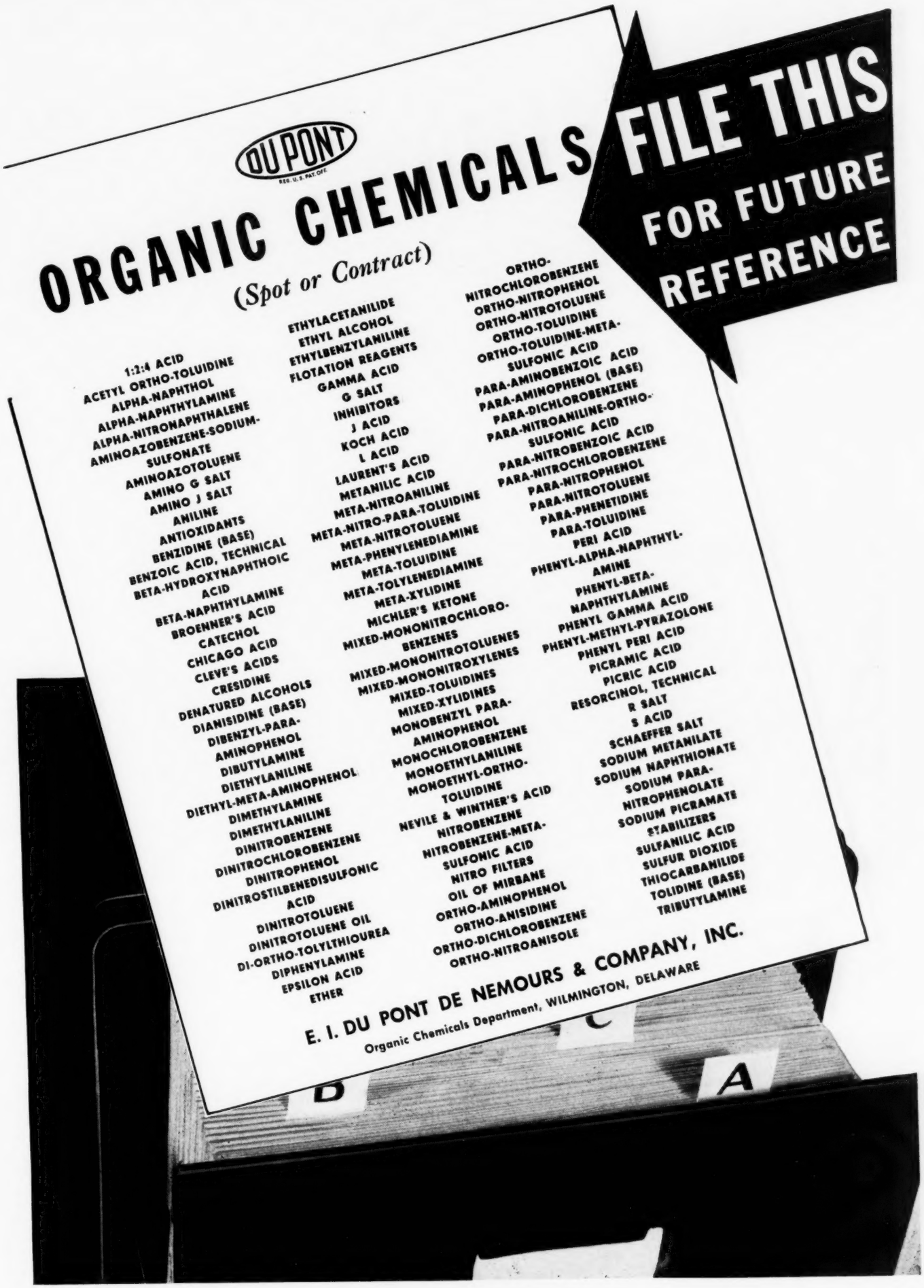
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